# Electronic Supplementary Information for

## Platinum(II) photo-catalysis for highly selective difluoroalkylation reactions

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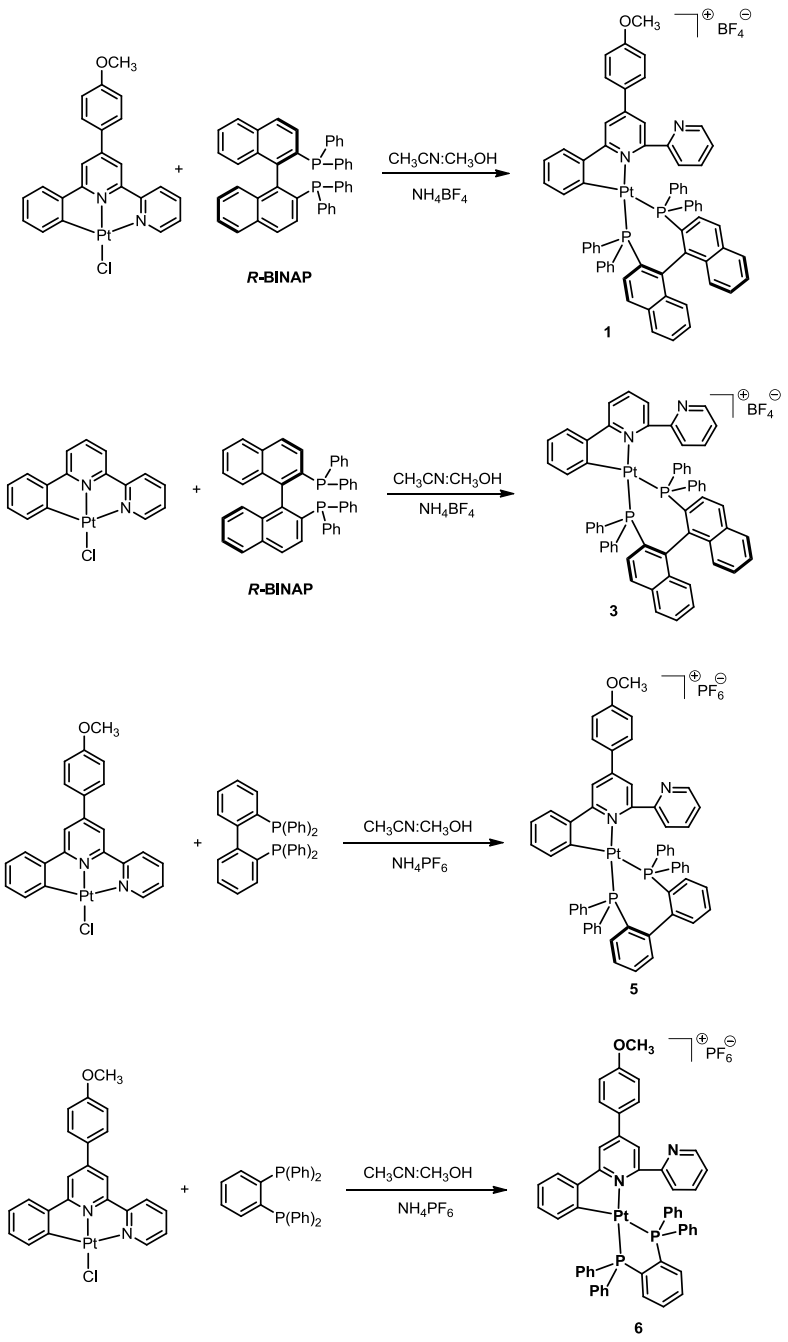
# 1. Experimental section

## a) General information

All chemicals, unless otherwise noted, were purchased from commercial sources and were used without further purification. All solvents for photophysical studies were of HPLC grade. Unless stated otherwise, all reactions were carried out under nitrogen. The ligands of the Pt(II) complexes were synthesized according to literature methods.[1-4] Irradiation with visible light was performed using blue LEDs illumination instruments.

The nuclear magnetic resonance spectra were recorded on the Bruker Ascend$^{TM}$ 400 MHz NMR spectrometer and the Bruker Ascend$^{TM}$ 500 MHz NMR spectrometer with tetramethylsilane (TMS) as an internal standard. High resolution mass spectra were recorded using a Q Exactive mass spectrometer (Thermo Fisher Scientific, USA). The absorption spectra were recorded on a Thermo Scientific Evolution 201 UV/Visible Spectrophotometer. The emission spectra were recorded on an Edinburg spectrometer FLS-980 equipped with MCP-PMT detectors. X-Ray diffraction data of the single crystal were collected on Bruker X8 Proteum diffractometer.

**b) Method for the synthesis of the Pt(II) complexes 1, 3, 5 and 6**




**Scheme S1**. Synthesis of the Pt(II) complexes **1, 3, 5** and **6**.

The Pt(II) complexes were easily synthesized by the combination of the precursors $Pt^{II}$(C^N^N)Cl and diphosphine ligands as shown in Scheme S1. The precursors $Pt^{II}$(C^N^N)Cl were synthesized according to the previous reported literatures.[1] A mixture of $Pt^{II}$(C^N^N)Cl and equimolar diphosphine ligand in $CH_3CN$:$CH_3OH$ (1:1 v/v) was stirred for about 4 h until all the substrates were dissolved in the solution

under nitrogen atmosphere. The reaction mixture was evaporated and purified with neutral alumina column chromatography using $CH_2Cl_2$:$CH_3OH$ (100:1) as eluent. Nearly quantitative amount of the desired Pt(II) complexes $Pt^{II}$(C^N)(P^P)Cl could be obtained. Addition of methanol solution of $NH_4BF_4$ into methanol solution of $Pt^{II}$(C^N)(P^P)Cl resulted in the generation of $[Pt^{II}(C^N)(P^P)]BF_4$.

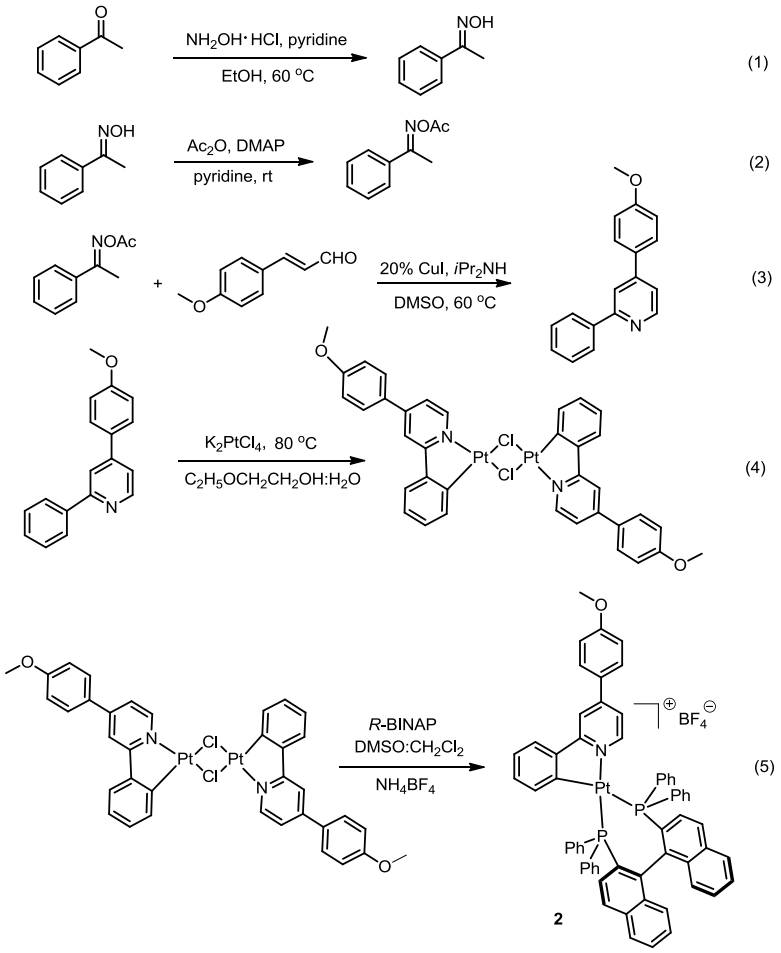
**Pt(II) complex 1**: **$^1$H NMR** (500 MHz, $CD_3OD$) δ = 8.70 (s, 2H), 8.40 (s, 1H), 8.12 (d, *J* = 7.7 Hz, 1H), 7.87 – 7.71 (m, 8H), 7.69 – 7.42 (m, 6H), 7.41 – 7.09 (m, 14H), 6.97 (t, *J* = 7.6 Hz, 1H), 6.84 (t, *J* = 7.6 Hz, 1H), 6.71 (t, *J* = 7.3 Hz, 1H), 6.56 (m, 5H), 6.45 (t, *J* = 6.9 Hz, 2H), 6.38 (d, *J* = 8.7 Hz, 1H), 6.26 – 6.17 (m, 2H), 6.10 (d, *J* = 8.6 Hz, 1H), 3.94 (s, 3H). **$^{31}$P NMR** (202 MHz, $CD_3OD$) δ = 14.05 (d, *J* = 24.2 Hz), 13.35 (d, *J* = 24.1 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{67}H_{49}ON_2P_2Pt$: 1154.2962, found: 1154.2960.

**Pt(II) complex 3**: **$^1$H NMR** (400 MHz, $CD_3OD$) δ = 8.75 (s, 3H), 8.18 (d, *J* = 8.2 Hz, 1H), 8.04 – 7.85 (m, 3H), 7.84 – 7.68 (m, 5H), 7.60 (dt, *J* = 17.5, 9.0 Hz, 5H), 7.46 (s, 2H), 7.40 – 7.27 (m, 6H), 7.24 – 7.11 (m, 3H), 6.96 (s, 2H), 6.84 (t, *J* = 9.5 Hz, 1H), 6.71 (m, 1H), 6.66 – 6.50 (m, 5H), 6.44 (m, 2H), 6.37 (d, *J* = 8.7 Hz, 1H), 6.21 (m, 2H), 6.10 (d, *J* = 8.5 Hz, 1H). **$^{31}$P NMR** (162 MHz, $CD_3OD$) δ = 14.19 (d, *J* = 24.3 Hz), 13.17 (d, *J* = 24.3 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{60}H_{43}N_2P_2Pt$: 1048.2544, found: 1048.2534.

**Pt(II) complex 5**: **$^1$H NMR** (500 MHz, $CD_3OD$) δ = 8.76 (s, 2H), 8.38 (s, 1H), 8.13 (d, *J* = 7.6 Hz, 1H), 7.91 – 7.74 (m, 7H), 7.63 – 7.51 (m, 1H), 7.39 – 7.08 (m, 18H), 6.97 – 6.88 (m, 6H), 6.68 – 6.63 (m, 2H), 6.28 – 6.22 (m, 3H), 6.03 (s, 1H), 3.93 (s, 3H). **$^{31}$P NMR** (202 MHz, DMSO) δ = 12.20 (s), 10.80 (s), -144.21 (hept, *J* = 706.0 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{59}H_{45}ON_2P_2Pt$: 1054.2649, found: 1054.2629.

**Pt(II) complex 6**: **$^1$H NMR** (500 MHz, $CD_3CN$) δ = 8.24 (d, *J* = 4.2 Hz, 1H), 8.08 (s, 1H), 7.90 (d, *J* = 7.8 Hz, 1H), 7.83 – 7.75 (m, 3H), 7.70 (s, 1H), 7.64 – 7.21 (m, 25H), 7.17 – 7.03 (m, 4H), 6.85 (dd, *J* = 7.2, 4.9 Hz, 1H), 6.67 (t, *J* = 7.3 Hz, 1H), 3.90 (s, 3H). **$^{31}$P NMR** (202 MHz, $CD_3CN$) δ = 44.56 (s), 37.50 (s), -144.63 (hept, *J* = 706.3 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{53}H_{41}ON_2P_2Pt$: 978.2336, found: 978.2328.

## c) Method for the synthesis of the Pt(II) complexes 2 and 4




**Scheme S2**. Synthesis of the Pt(II) complex **2**.

The synthesis of Pt(II) complex **2** was illustrated in Scheme S2 reference to the literatures.[2-4] Details for the synthesis are shown as following:

(1). Acetophenone (2.64 g, 22.0 mmol) and pyridine (5.0 mL, 61.8 mmol) were dissolved in 10 mL ethanol. Then $NH_2OH$•HCl (2.29 g, 33.0 mmol) was added. The reaction mixture was stirred at 60 °C for 1 h. The reaction was quenched by water and the organic layer was extracted with ethyl acetate. The combined organic phases were washed with 1 N aqueous HCl and brine, and dried over $NaSO_4$. The solvent was removed by rotary evaporation to give the crude product acetophenone oxime.

(2). The crude product acetophenone oxime dissolved in 10 mL pyridine was treated with $Ac_2O$ (4.2 mL, 44.4 mmol) and a catalytic amount of DMAP (5 mg). The mixture was stirred at room temperature for 1 h. The reaction was treated with water and was extracted with ethyl acetate. The combined organic phases were washed with

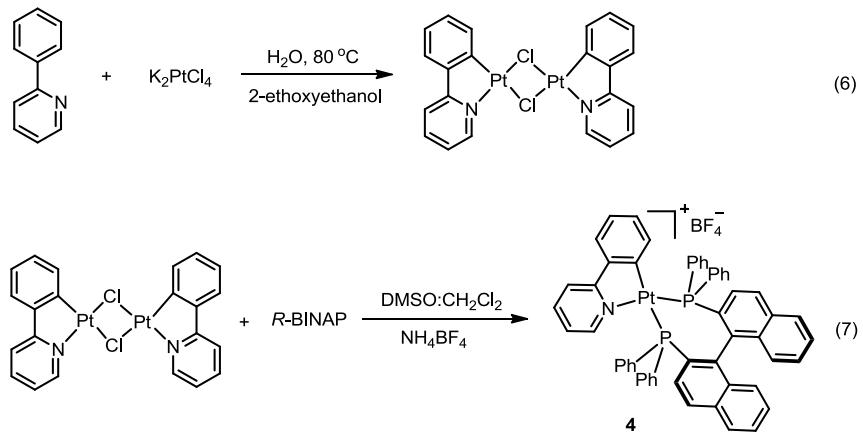
1 N aqueous HCl and brine, and dried over $NaSO_4$. The solvent was removed by rotary evaporation to give the crude product acetophenone *O*-acetyl oxime. Further recrystallization from ethyl acetate-hexane was conducted to provide *E*-acetophenone *O*-acetyl oxime.

(3). A 50 mL round-bottom flask equipped with a stirrer bar was charged with *E*-acetophenone *O*-acetyl oxime (5 mmol, 885 mg) and CuI (190 mg, 1 mmol, 20 mol%). The round-bottom flask was quickly evacuated and refilled with $N_2$ for three times, followed by the addition of α,β-unsaturated aldehyde (8 mmol, 1.3 g), diisopropylamine (10 mmol, 1.01 g), and DMSO (20 mL). Then the reaction mixture was stirred at 60 ℃ for 16 h. Upon cooling to room temperature, the reaction mixture was washed with water and extracted with ethyl acetate. The combined organic phase was dried over $Na_2SO_4$. The solvent was removed by rotary evaporation. The residue was purified by flash chromatography on silica gel to afford the C^N ligand.

(4). An aqueous degassed solution (5 mL) of potassium tetrachloroplatinate (415 mg, 1.0 mmol) was added under $N_2$ to a stirred degassed solution of the above C^N ligand (261 mg, 1.0 mmol) in 15 mL 2-ethoxyethanol. The reaction mixture was heated to 80 ℃ for 24 h. After cooling in an ice bath, distilled water was added. The precipitate was filtered, washed with ethanol and dried under vacuum.

(5). A mixture of the precipitate in (4) and 2.0 equivalents of *R*-BINAP was dissolved in $CH_2Cl_2$:DMSO (1:1 v/v), the mixture was stirred for about 4 h until all the substrates were dissolved in the solution under nitrogen atmosphere. The reaction mixture was washed with water and extracted with dichloromethane. The dichloromethane was dried over $Na_2SO_4$. The solvent was removed by rotary evaporation to give the desired Pt(II) complex **2** quantitatively.

Pt(II) complex **2**: **$^1$H NMR** (400 MHz, DMSO) δ = 8.41 (s, 1H), 8.13 (d, *J* = 7.9 Hz, 1H), 7.92 (d, *J* = 8.9 Hz, 2H), 7.85 – 7.66 (m, 7H), 7.63 – 7.54 (m, 3H), 7.54 – 7.42 (m, 8H), 7.40 – 7.30 (m, 2H), 7.25 – 7.21 (m, 2H), 7.19 – 7.12 (m, 4H), 7.11 – 7.00 (m, 5H), 6.98 – 6.89 (m, 2H), 6.71 (d, *J* = 8.6 Hz, 1H), 6.66 – 6.53 (m, 3H), 6.52 – 6.44 (m, 2H), 3.84 (s, 3H). **$^{31}$P NMR** (162 MHz, DMSO) δ = 21.90 (d, *J* = 22.7 Hz), 16.42 (d, *J* = 22.7 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{62}H_{46}ONP_2Pt$: 1077.2697, found: 1077.2709.




**Scheme S3**. Synthesis of the Pt(II) complex **4**.

The synthesis of Pt(II) complex **4** was illustrated in Scheme S3. Details for the synthesis are shown as following:

(6). An aqueous degassed solution (5 mL) of potassium tetrachloroplatinate (415 mg, 1.0 mmol) was added under $N_2$ to a stirred degassed solution of the 2-phenylpyridine (155 mg, 1.0 mmol) in 15 mL 2-ethoxyethanol. The reaction mixture was heated to 80 ℃ for 24 h. After cooling in an ice bath, distilled water was added. The precipitate was filtered, washed with ethanol and dried under vacuum.

(7). A mixture of the precipitate in (6) and 2.0 equivalents of *R*-BINAP was dissolved in $CH_2Cl_2$:DMSO (1:1 v/v), the mixture was stirred for about 4 h until all the substrates were dissolved in the solution under nitrogen atmosphere. The reaction mixture was washed with water and extracted with dichloromethane. The dichloromethane was dried over $Na_2SO_4$. The solvent was removed by rotary evaporation to give the desired Pt(II) complex **4** quantitatively.

Pt(II) complex **4**: $^1$H NMR (400 MHz, DMSO) δ = 8.58 (s, 2H), 8.17 (d, *J* = 8.2 Hz, 1H), 7.95 (t, *J* = 7.8 Hz, 1H), 7.91 – 7.62 (m, 9H), 7.61 – 7.30 (m, 10H), 7.27 – 7.08 (m, 5H), 7.08 – 6.78 (m, 6H), 6.77 – 6.28 (m, 6H). **$^{31}$P NMR** (162 MHz, DMSO) δ = 22.16 (d, *J* = 22.6 Hz), 16.19 (d, *J* = 22.7 Hz). **HRMS** (ESI) (m/z): $[M]^+$ calcd. for $C_{55}H_{40}NP_2Pt$: 971.2278, found: 971.2273.

**d) Crystal structure determination of 1**

Single crystals of **1** were prepared by dispersing hexane into minimal amount of methanol solution of **1**. The X-ray diffraction data were collected on a Bruker X8 Proteum diffractometer equipped with a '**Bruker APEX-II CCD**' detector. The crystal was kept at 100 K during data collection. The diffraction images were interpreted and the diffraction intensities were integrated by using the program SAINT. Multi-scan SADABS was applied for absorption correction. By using Olex2,[5] the structure was solved with the XS[6] structure solution program using direct Methods and refined with the XL[6] refinement package using Least Squares minimization. The positions of the H atoms were calculated on the basis of the riding mode with thermal parameters equal to 1.2 times that of the associated C atoms, 1.5 times that of the C atoms in methyl group and these positions participated in the calculation of the final R indices. In the final stage of least-squares refinement, all non-hydrogen atoms were refined anisotropically.

**Table S1**. Crystal data and structure refinement for **1**.

| | |
|---|---|
| Identification code | **1** |
| Empirical formula | $C_{135}H_{102}B_2F_8N_4O_3P_4Pt_2$ |
| Formula weight | 2515.88 |
| Temperature/K | 100 |
| Crystal system | Triclinic |
| Space group | P1 |
| a/Å | 11.2381(7) |
| b/Å | 14.8266(9) |
| c/Å | 16.8813(10) |
| α/° | 97.7440(10) |
| β/° | 98.3340(10) |
| γ/° | 101.0580(10) |
| Volume/Å$^3$ | 2692.9(3) |
| Z | 1 |
| $\rho_{calc}$g/cm$^3$ | 1.551 |
| μ/mm$^{-1}$ | 5.949 |
| F(000) | 1262 |
| Crystal size/mm$^3$ | 0.26 × 0.25 × 0.22 |
| Radiation | CuKα (λ = 1.54178) |
| 2Θ range for data collection/° | 5.366 to 133.608 |
| Index ranges | -13 ⩽ h ⩽ 9, -17 ⩽ k ⩽ 17, -19 ⩽ l ⩽ 19 |
| Reflections collected | 51084 |
| Independent reflections | 11133 [$R_{int}$ = 0.0453, $R_{sigma}$ = 0.0416] |
| Data/restraints/parameters | 11133/3/1427 |
| Goodness-of-fit on F$^2$ | 1.051 |
| Final R indexes [I>=2σ (I)] | $R_1$ = 0.0248, w$R_2$ = 0.0610 |
| Final R indexes [all data] | $R_1$ = 0.0248, w$R_2$ = 0.0610 |
| Largest diff. peak/hole / e Å$^{-3}$ | 0.96/-0.70 |
| Flack parameter | 0.007(4) |

**Table S2.** Selected bond lengths for **1**.

| Atom | Atom | Length/Å | Atom | Atom | Length/Å |
|---|---|---|---|---|---|
| Pt1 | P1 | 2.2494(1) | Pt2 | P3 | 2.3538(1) |
| Pt1 | P2 | 2.3506(1) | Pt2 | P4 | 2.2460(1) |
| Pt1 | N1 | 2.113(4) | Pt2 | N3 | 2.112(4) |
| Pt1 | C68 | 2.066(5) | Pt2 | C1 | 2.068(5) |

**Table S3.** Selected bond angles(°) for **1**.

| Atom | Atom | Atom | Angle/° | Atom | Atom | Atom | Angle/° |
|---|---|---|---|---|---|---|---|
| P1 | Pt1 | P2 | 92.95(4) | P4 | Pt2 | P3 | 91.73(4) |
| N1 | Pt1 | P1 | 169.79(1) | N3 | Pt2 | P3 | 96.01(1) |
| N1 | Pt1 | P2 | 94.94(1) | N3 | Pt2 | P4 | 170.66(1) |
| C68 | Pt1 | P1 | 96.32(1) | C1 | Pt2 | P3 | 154.49(1) |
| C68 | Pt1 | P2 | 157.18(1) | C1 | Pt2 | P4 | 96.38(1) |
| C68 | Pt1 | N1 | 78.73(2) | C1 | Pt2 | N3 | 78.78(2) |

**e) General procedure for visible-light-induced difluoroalkylation of cinnamic acids and terminal alkynes catalyzed by the Pt(II) complexes**

The cinnamic acid derivatives (or terminal alkynes) (0.2 mmol, 1 equiv.), ethyldifluoroiodoacetate (0.22 mmol, 1.1 equiv.), sodium dicarbonate (0.22 mmol, 1.1 equiv.) (5.0 equiv. DIPEA) and the Pt(II) complex **1** (0.001 mmol, 0.5 mol%) were dissolved in 5.0 mL $CH_3CN$ ($CH_3CN$:$CH_3OH$) in a 15 mL reaction tube equipped with magnetic stirring bar, the reaction tube was sealed and the resulting mixture was deaerated with nitrogen for 15 min, then the reaction tube was irradiated by blue LEDs for 12 h. After reaction, the organic layer was extracted with diethyl ether (3 × 5 mL). The combined organic phases were washed with brine and dried over sodium sulphate. The solvent was removed by rotary evaporation and purified by column chromatography on silica gel using hexane/ethyl acetate (25:1) as the eluent.

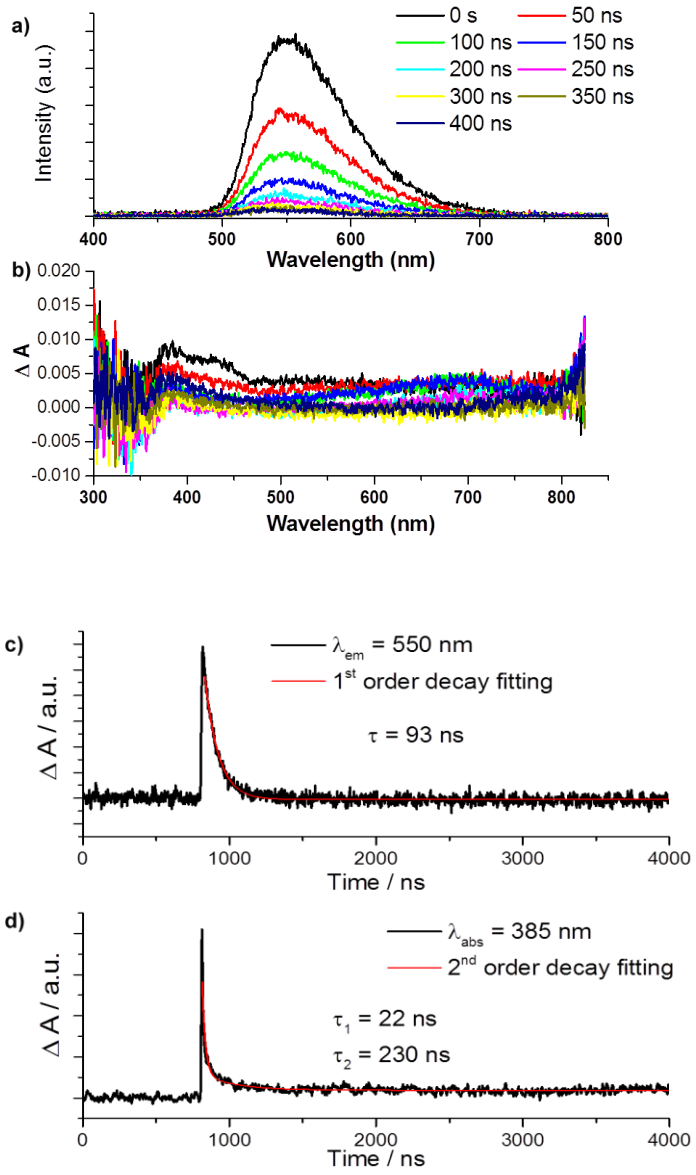



**Fig. S1** Nano-second time-resolved emission (ns-TRE), absorption (ns-TA) spectra, kinetic decay trace of a) selected emission and b) absorption peaks, c), d) and their decay fitting plots of **1** (concentration ca. $1.0 \times 10^{-5}$ M) in degassed acetonitrile at room temperature.

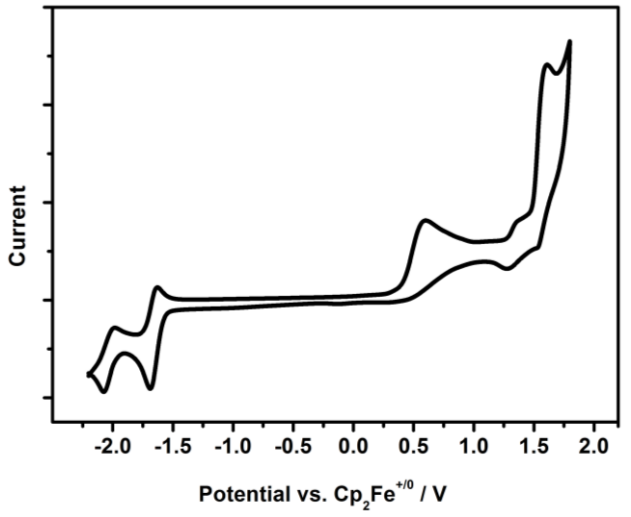



**Fig. S2** Cyclic voltammogram of **1** ($1.0 \times 10^{-3}$ M) in degassed acetonitrile at 298 K (with 0.1 M $^{n}Bu_4NPF_6$ as supporting electrolyte; $Ag/AgNO_3$ (0.1 M in $CH_3CN$) reference electrode; scanning rate: 50 mV $s^{-1}$; $Cp_2Fe^{+/0}$ occurs at 0.1 V *vs* $Ag/AgNO_3$).

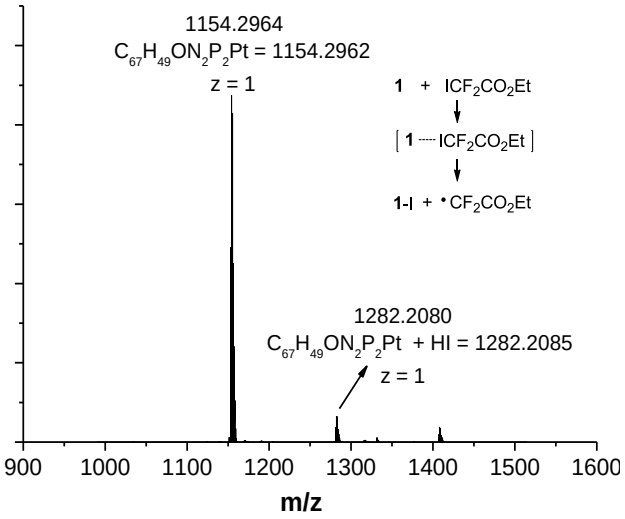



**Fig. S3** HRMS spectra of **1** in the presence of substrate **b1**.

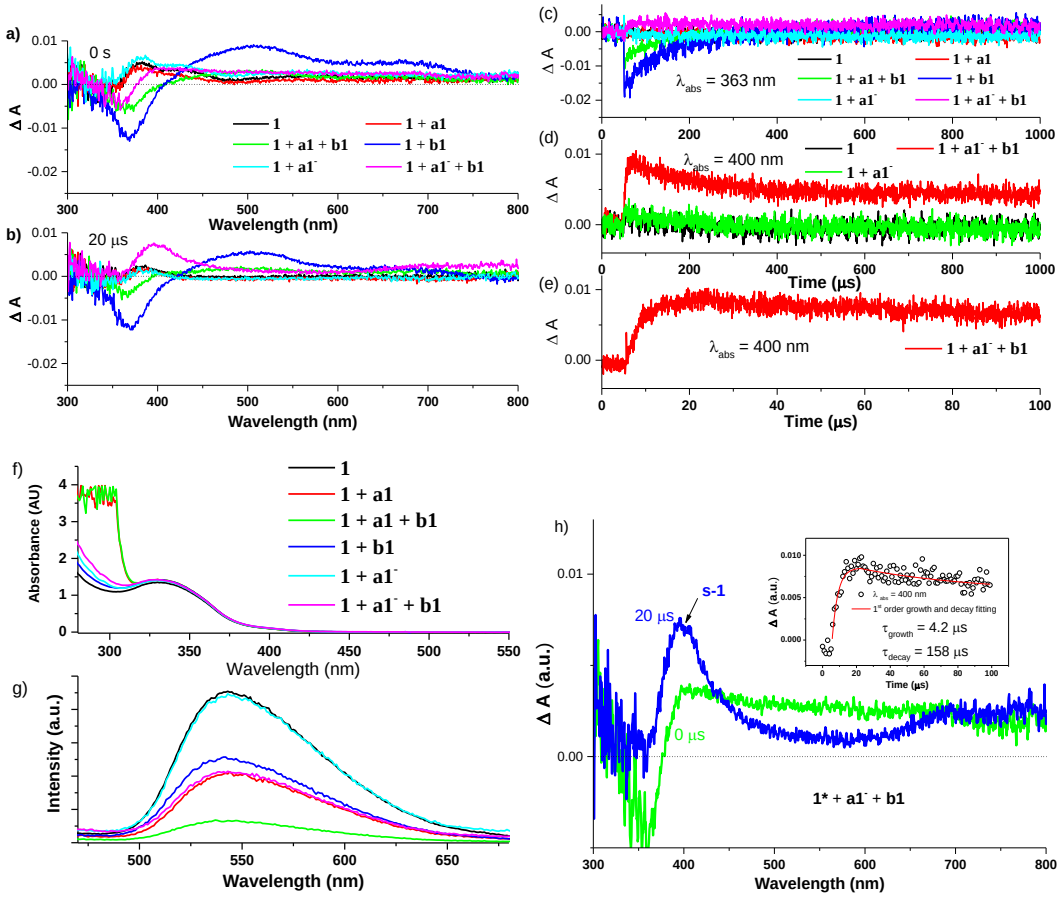



**Fig. S4** ns-TA spectra of **1** ($5 \times 10^{-5}$ M) in $CH_3CN$ in the presence of 20 equiv. of substrates **a1**, **a1**+**b1**, **b1**, **a1**$^-$, and **a1**$^-$+**b1** (1 mM for each component) after 355 nm laser excitation recorded at a) 0 s and b) 20 μs. The kinetic studies for absorption bleaches at c) 363 nm; d) 400 nm. e) is to show the growth process for absorption at 400 nm; f) UV/Vis absorption spectra and g) emission spectra of above solutions. h) is to show the reaction between **a1**$^-$ and $\bullet R_F$ from time-resolved spectroscopic methods.

**Details on purification/synthesis of substrates used in time-resolved spectroscopic measurements:**

Substrate **b1** (ca. 5 mL; brown color) was further purified by treating with saturated $Na_2S_2O_3$ aqueous solution (5 mL), dried by $MgSO_4$, and passed through a short pad of celite, about 3 mL of **b1** was received before photo-physical examination. Substrate **a1**$^-$ (with counter cation of $NBu_4^+$) was synthesized by combining the methanolic solution of **a1** (3 mmol in 3 mL) and $NBu_4OH$ (1 M/L; 3 mL) and removing the methanol solvent to give a quantity yield.

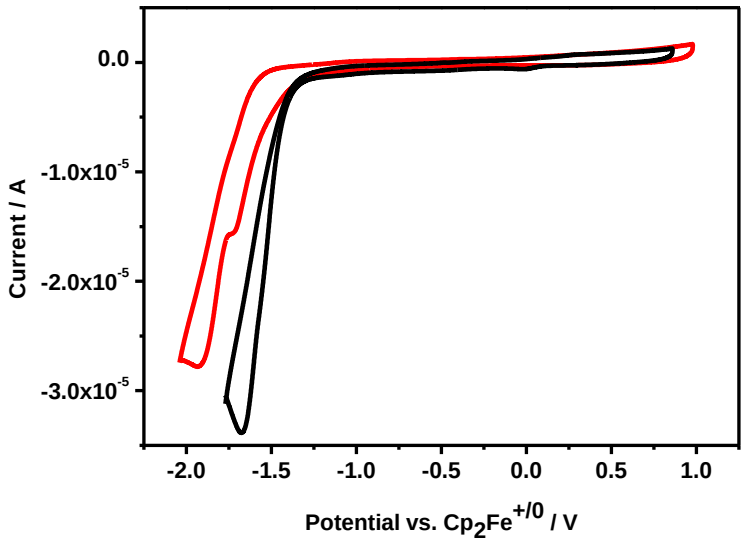
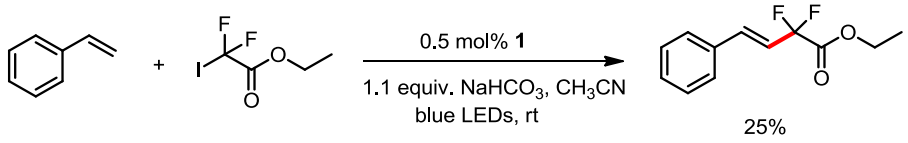
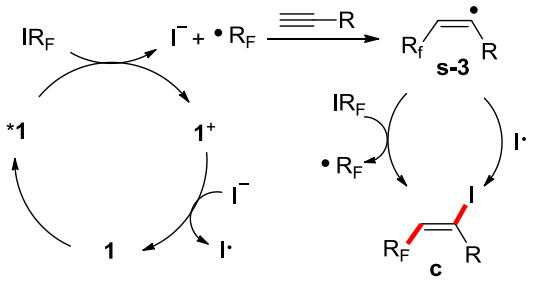



**Fig. S5** Cyclic voltammogram of **b1** ($ICF_2CO_2Et$; $1.0 \times 10^{-3}$ M), **b2** ($BrCF_2CO_2Et$; $1.0 \times 10^{-3}$ M) in degassed acetonitrile at 298 K (with 0.1 M $^nBu_4NPF_6$ as supporting electrolyte; $Ag/AgNO_3$ (0.1 M in $CH_3CN$) reference electrode; scanning rate: 50 mV $s^{-1}$).




**Scheme S4.** The terminal alkene styrene was conducted in the reaction.




**Scheme S5.** Plausible reaction pathway.

## f) References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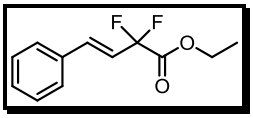
# 2. Characterization data of the products

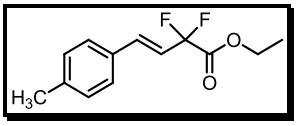


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.93 – 7.47 (m, 2H), 7.44 – 7.33 (m, 3H), 7.11 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.34 (dt, *J* = 16.2, 11.4 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.95 (t, *J* = 35 Hz), 136.86 (t, *J* = 10 Hz), 134.13, 129.67, 128.86, 127.47, 118.87 (t, *J* = 25 Hz), 112.76 (t, *J* = 247.5 Hz), 63.14, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.20 (dd, *J* = 11.4, 3.7 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_2$: 227.0878, found: 227.0874.

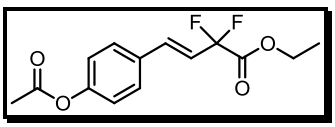


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.37 (d, *J* = 8.1 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.08 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.29 (dt, *J* = 16.2, 11.5 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 2.39 (s, 3H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 164.04 (t, *J* = 35 Hz), 139.88, 136.76 (t, *J* = 10 Hz), 131.39, 129.56, 127.41, 117.78 (t, *J* = 25 Hz), 112.90 (t, *J* = 247 Hz), 63.06, 21.33, 13.96.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.93 (dd, *J* = 11.5, 2.4 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_2$: 241.1035, found: 241.1030.

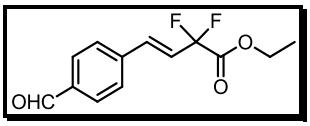


**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ = 7.48 (d, *J* = 8.6 Hz, 2H), 7.13 (d, *J* = 8.6 Hz, 2H), 7.08 (dt, *J* = 16.2, 2.3 Hz, 1H), 6.28 (dt, *J* = 16.2, 11.4 Hz, 1H), 4.37 (q, *J* = 7.1 Hz, 2H), 2.33 (s, 3H), 1.38 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 169.24, 163.86 (t, *J* = 35 Hz), 151.60, 135.81 (t, *J* = 9.4 Hz), 131.85, 128.57, 122.11, 119.06 (t, *J* = 25 Hz), 112.64 (t, *J* = 247.5 Hz), 63.19, 21.12, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.29 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{14}H_{14}F_2O_4Na$: 307.0752, found: 307.0745.

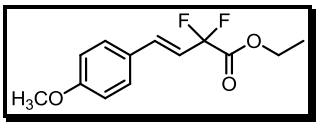



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 10.05 (s, 1H), 7.92 (d, *J* = 8.3 Hz, 2H), 7.63 (d, *J* = 8.2 Hz, 2H), 7.16 (dt, *J* = 16.2 Hz, 2.5, 1H), 6.47 (dt, *J* = 16.2 Hz, 11.3, 1H), 4.39 (q, *J* = 7.1 Hz, 2H), 1.40 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 191.42, 163.55 (t, *J* = 34.5 Hz), 139.79, 136.87, 135.56 (t, *J* = 9.4 Hz), 130.16, 128.02, 122.15 (t, *J* = 25 Hz), 112.30 (t, *J* = 248 Hz), 63.33, 13.95.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.74 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{13}F_2O_3$: 255.0827, found: 255.0824.

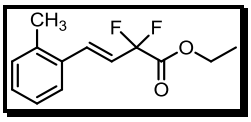



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.41 (d, *J* = 8.7 Hz, 2H), 7.04 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.92 (d, *J* = 8.8 Hz, 2H), 6.19 (dt, *J* = 16.2, 11.5 Hz, 1H), 4.37 (q, *J* = 7.1 Hz, 2H), 3.85 (s, 3H), 1.38 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 164.13 (t, *J* = 35 Hz), 160.80, 136.33 (t, *J* = 9.5 Hz), 128.94, 126.80, 116.34 (t, *J* = 24.5 Hz), 114.24, 113.01 (t, *J* = 247 Hz), 63.07, 55.35, 13.98.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.67 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{14}F_2O_3Na$: 279.0803, found: 279.0798.

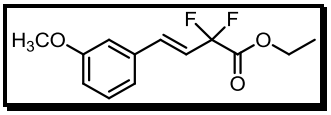



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.50 (d, *J* = 7.8 Hz, 1H), 7.38 (dt, *J* = 16.1, 2.6 Hz, 1H), 7.30 – 7.19 (m, 3H), 6.25 (dt, *J* = 16.1, 11.4 Hz, 1H), 4.39 (q, *J* = 7.1 Hz, 2H), 2.42 (s, 3H), 1.40 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.99 (t, *J* = 34.9 Hz), 136.79, 134.70 (t, *J* = 9.4 Hz), 133.24, 130.68, 129.45, 126.37, 126.12, 120.09 (t, *J* = 24.5 Hz), 112.77 (t, *J* = 248.4 Hz), 63.13, 19.66, 13.99.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.06 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{14}F_2O_2Na$: 263.0854, found: 263.0852.

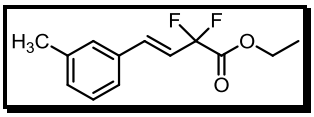


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.33 – 7.28 (m, 1H), 7.11 – 7.04 (m, 2H), 7.01 – 6.98 (m, 1H), 6.93 (dd, *J* = 8.2, 2.4 Hz, 1H), 6.32 (dt, *J* = 16.2, 11.4 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 3.85 (s, 3H), 1.39 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.92 (t, *J* = 35 Hz), 159.93, 136.79 (t, *J* = 9.4 Hz), 135.50, 129.88, 120.08, 119.16 (t, *J* = 25 Hz), 112.71(t, *J* = 247.5 Hz), 112.61, 63.15, 55.31, 13.96.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.23 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_3$: 257.0984, found: 257.0978.

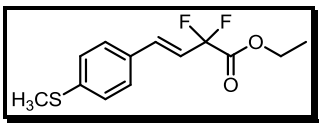


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.28 (t, *J* = 2.8 Hz, 3H), 7.22 – 7.18 (m, 1H), 7.07 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.31 (dt, *J* = 16.2, 11.5 Hz, 1H), 4.37 (q, *J* = 7.1 Hz, 2H), 2.39 (s, 3H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 164.01 (t, *J* = 35.1 Hz), 138.54, 136.97 (t, *J* = 9.4 Hz), 134.06, 130.47, 128.75, 128.11, 124.66, 118.60 (t, *J* = 25.0 Hz), 112.80 (t, *J* = 248.5 Hz), 63.12, 21.34, 13.99.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.22 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{14}F_2O_2Na$: 263.0854, found: 263.0853.

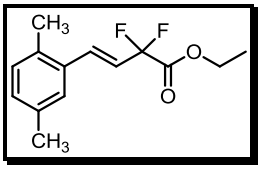


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.38 (d, *J* = 8.4 Hz), 7.24 (d, *J* = 8.4 Hz, 2H), 7.04 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.27 (dt, *J* = 16.2, 11.4 Hz, 1H), 4.37 (q, *J* = 7.1 Hz, 2H), 2.51 (s, 3H), 1.38 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.96 (t, *J* = 34.9 Hz), 140.94, 136.21 (t, *J* = 9.5 Hz), 130.71, 127.81, 126.16, 117.89 (t, *J* = 25.0 Hz), 112.82 (t, *J* = 248.5 Hz), 63.12, 15.29, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.96 (dd, *J* = 11.5, 2.5 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{14}SF_2O_2Na$: 295.0575, found: 295.0576.

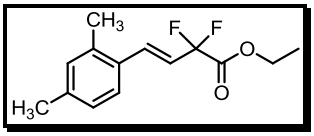


**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ = 7.37 – 7.30 (m, 2H), 7.12 – 7.08 (m, 2H), 6.23 (dt, *J* = 16.1, 11.4 Hz, 1H), 4.39 (q, *J* = 7.1 Hz, 2H), 2.36 (d, *J* = 4.1 Hz, 6H), 1.40 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 164.05 (t, *J* = 35 Hz), 135.80, 134.71 (t, *J* = 9.4 Hz), 133.76, 132.96, 130.60, 130.26, 126.65, 119.73 (t, *J* = 25 Hz), 112.82 (t, *J* = 247.5 Hz), 63.11, 20.95, 19.17, 14.00.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.96 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{14}H_{17}F_2O_2$: 255.1191, found: 255.1185.

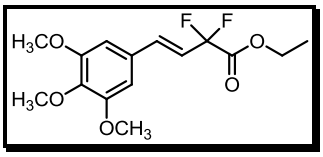


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.39 (d, *J* = 8.5 Hz, 1H), 7.32 (dt, *J* = 16.1, 2.5 Hz, 1H), 7.04 (d, *J* = 7.0 Hz, 2H), 6.19 (dt, *J* = 16.1, 11.4 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 2.37 (s, 3H), 2.35 (s, 3H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 164.09 (t, *J* = 35.0 Hz), 139.56, 136.70, 134.49 (t, *J* = 9.4 Hz), 131.44, 130.35, 127.11, 126.02, 118.94 (t, *J* = 24.8 Hz), 112.89 (t, *J* = 248.2 Hz), 63.07, 21.22, 19.59, 14.00.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.87 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{14}H_{16}F_2O_2Na$: 277.1011, found: 277.1015.

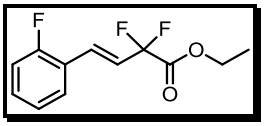


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.00 (dt, *J* = 16.1, 2.4 Hz, 1H), 6.68 (s, 2H), 6.22 (dt, *J* = 16.1, 11.4 Hz, 1H), 4.36 (q, *J* = 7.1 Hz, 2H), 3.91 – 3.85 (m, 9H), 1.37 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.96 (t, *J* = 34.9 Hz), 153.47, 139.53, 136.83 (t, *J* = 9.5 Hz), 129.67, 118.16 (t, *J* = 25.0 Hz), 112.74 (t, *J* = 248.7 Hz), 104.67, 63.14, 60.92, 56.17, 13.94.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.96 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{15}H_{19}F_2O_5$: 317.1195, found: 317.1187.

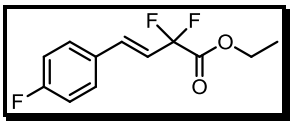


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.49 (td, *J* = 7.6, 1.5 Hz, 1H), 7.38 – 7.33 (m, 1H), 7.23 (dt, *J* = 16.4, 2.6 Hz, 1H), 7.20 – 7.15 (m, 1H), 7.14 – 7.09 (m, 1H), 6.46 (dt, *J* = 16.4, 11.3 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.80 (t, *J* = 35 Hz), 160.95 (d, *J* = 251 Hz), 131.14 (d, *J* = 8.7 Hz), 129.78 (td, *J* = 11.5, 8.4, 3.2 Hz), 128.63 (d, *J* = 2.9 Hz), 124.42 (d, *J* = 3.7 Hz), 122.06 (d, *J* = 11.5 Hz), 121.46 (td, *J* = 25.0, 7.1 Hz), 116.13 (d, *J* = 20 Hz), 112.57 (t, *J* = 248 Hz), 63.20, 13.95.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.70 (s, 2F), -115.68 (s, 1F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{11}F_3O_2Na$: 267.0603, found: 267.0602.

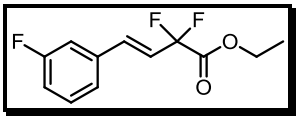


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.51 – 7.40 (m, 2H), 7.14 – 7.01 (m, 3H), 6.25 (dt, *J* = 16.2 Hz, 11.3, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 163.89 (t, *J* = 34 Hz), 162.50 (d, *J* = 248.5 Hz), 135.63 (t, *J* = 9.5 Hz), 130.31, 129.27 (d, *J* = 8.4 Hz), 118.59 (td, *J* = 25 Hz), 116.04 (d, *J* = 21.5 Hz), 112.63 (t, *J* = 247.5 Hz), 63.20, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.19 (s, 2F), -110.90 (s, 1F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}F_3O_2$: 245.0783, found: 245.0781.

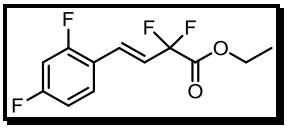


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.39 – 7.34 (m, 1H), 7.24 (d, *J* = 7.8 Hz, 1H), 7.21 – 7.14 (m, 1H), 7.12 – 7.03 (m, 2H), 6.33 (dt, *J* = 16.2, 11.3 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.72 (t, *J* = 35 Hz), 163.02 (d, *J* = 245 Hz), 136.34 (d, *J* = 8.0 Hz), 135.67 (td, *J* = 9.4, 6.8 Hz), 130.43 (d, *J* = 8.3 Hz), 123.46, 120.27 (t, *J* = 25 Hz), 116.55 (d, *J* = 10.5 Hz), 113.88 (d, *J* = 11 Hz), 112.46 (t, *J* = 247 Hz), 63.26, 13.95.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.55 (s, 2F), -112.61 (s, 1F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{11}F_3O_2Na$: 267.0603, found: 267.0604.

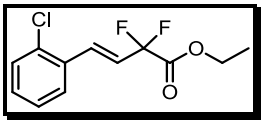


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.51 – 7.45 (m, 1H), 7.16 (dt, *J* = 16.4, 2.6 Hz, 1H), 6.99 – 6.77 (m, 2H), 6.39 (dt, *J* = 16.4, 11.2 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.72 (t, *J* = 35 Hz), 163.52 (dd, *J* = 251, 12.2 Hz), 161.15 (dd, *J* = 254, 12.1 Hz), 129.69 (dd, *J* = 9.9, 4.7 Hz), 128.81 (t, *J* = 9.5 Hz), 121.08 (tdd, *J* = 27.2, 22.9, 4.2 Hz), 118.55 (dd, *J* = 15.8, 3.5 Hz), 112.46 (t, *J* = 247.5 Hz), 111.96 (dd, *J* = 21.7, 3.7 Hz), 104.54 (t, *J* = 25 Hz), 63.22, 13.93.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.73 (s, 2F), -107.10 (d, *J* = 8.9, 1F), -111.21 (d, *J* = 8.9, 1F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{10}F_4O_2Na$: 285.0509, found: 285.0504.

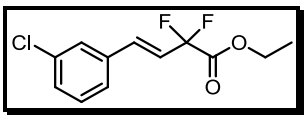


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.60 – 7.56 (m, 1H), 7.52 (dt, *J* = 16.2, 2.7 Hz, 1H), 7.45 – 7.39 (m, 1H), 7.33 – 7.28 (m, 2H), 6.34 (dt, *J* = 16.2, 11.1 Hz, 1H), 4.39 (q, *J* = 7.1 Hz, 2H), 1.40 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.70 (t, *J* = 34.5 Hz), 134.32, 133.20 (t, *J* = 9.8 Hz), 132.45, 130.56, 130.06, 127.39, 127.09, 121.61 (t, *J* = 25 Hz), 112.49 (t, *J* = 247.5 Hz), 63.21, 13.96.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.15 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}ClF_2O_2$: 261.0488, found: 261.0484.

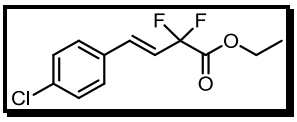


**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.46 (s, 1H), 7.37 – 7.31 (m, 3H), 7.04 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.34 (dt, *J* = 16.2, 11.3 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.69 (t, *J* = 35 Hz), 135.93, 135.47 (t, *J* = 9.5 Hz), 134.88, 130.11, 129.59, 127.29, 125.73, 120.39 (t, *J* = 25 Hz), 112.43 (t, *J* = 247.5 Hz), 63.26, 13.96.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.53 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}ClF_2O_2$: 261.0488, found: 261.0483.

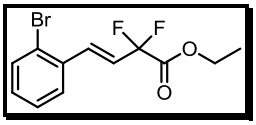



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.43 – 7.34 (m, 4H), 7.06 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.30 (dt, *J* = 16.2, 11.3 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.78 (t, *J* = 34 Hz), 135.67, 135.56 (t, *J* = 10 Hz), 132.61, 129.10, 128.67, 119.48 (t, *J* = 25 Hz), 112.55 (t, *J* = 247.5 Hz), 63.21, 13.95.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.31 (dd, *J* = 11.4, 2.5 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}ClF_2O_2$: 261.0488, found: 261.0484.

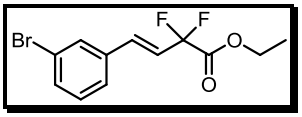



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.62 (dd, *J* = 8.0, 1.1 Hz, 1H), 7.56 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.48 (dt, *J* = 16.1, 2.6 Hz, 1H), 7.37 – 7.33 (m, 1H), 7.23 (td, *J* = 7.8, 1.5 Hz, 1H), 6.30 (dt, *J* = 16.1, 11.1 Hz, 1H), 4.39 (q, *J* = 7.1 Hz, 2H), 1.40 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.68 (t, *J* = 35 Hz), 135.80 (t, *J* = 9.7 Hz), 134.21, 133.31, 130.78, 127.75, 127.55, 124.65, 121.73 (t, *J* = 25 Hz), 112.44 (t, *J* = 247.5 Hz), 63.26, 14.00.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.10 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{11}BrF_2O_2Na$: 328.9782, found: 328.9778.

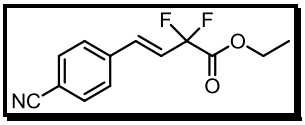



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.62 (s, 1H), 7.50 (d, *J* = 8.0 Hz, 1H), 7.38 (d, *J* = 7.8 Hz, 1H), 7.29 – 7.25 (m, 1H), 7.03 (dt, *J* = 16.2, 2.5 Hz, 1H), 6.33 (dt, *J* = 16.2, 11.3 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.69 (t, *J* = 34.6 Hz), 136.20, 135.37 (t, *J* = 9.5 Hz), 132.51, 130.37, 130.22, 126.17, 122.99, 120.43 (t, *J* = 25.1 Hz), 112.40 (t, *J* = 248.9 Hz), 63.26, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.55 (dd, *J* = 11.3, 2.5 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{11}BrF_2O_2Na$: 326.9803, found: 326.9807.

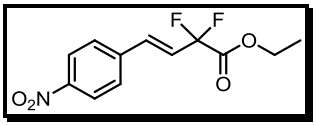


**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ = 7.70 (d, *J* = 8.3 Hz, 2H), 7.57 (d, *J* = 8.3 Hz, 2H), 7.12 (dt, *J* = 16.2, 2.3 Hz, 1H), 6.44 (dt, *J* = 16.2, 11.2 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.39 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 163.46 (t, *J* = 34.4 Hz), 138.39, 134.98 (t, *J* = 9.4 Hz), 132.67, 127.97, 122.55 (t, *J* = 25.1 Hz), 118.37, 113.02, 112.15 (t, *J* = 248.5 Hz), 63.43, 13.97.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.87 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{12}NF_2O_2Na$: 274.0650, found: 274.0656.

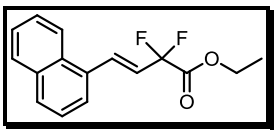



**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ = 8.27 (d, *J* = 8.4 Hz, 2H), 7.64 (d, *J* = 8.3 Hz, 2H), 7.17 (d, *J* = 16.2 Hz, 1H), 6.49 (dt, *J* = 16.2, 11.2 Hz, 1H), 4.40 (q, *J* = 7.1 Hz, 2H), 1.40 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (126 MHz, $CDCl_3$) δ = 163.41 (t, *J* = 34.2 Hz), 148.26, 140.22, 134.55 (t, *J* = 9.3 Hz), 128.20, 124.19, 123.27 (t, *J* = 25.2 Hz), 112.07 (t, *J* = 249.5 Hz), 63.48, 13.98.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -103.95 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{12}H_{11}NF_2O_4Na$: 294.0548, found: 294.0545.

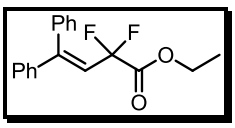



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 8.11 (d, *J* = 8.2 Hz, 1H), 7.97 – 7.87 (m, 3H), 7.68 (d, *J* = 7.2 Hz, 1H), 7.63 – 7.48 (m, 3H), 6.42 (dt, *J* = 15.9, 11.4 Hz, 1H), 4.43 (q, *J* = 7.1 Hz, 2H), 1.43 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 163.98 (t, *J* = 34.8 Hz), 134.35 (t, *J* = 9.5 Hz), 133.61, 131.76, 131.15, 129.92, 128.74, 126.79, 126.24, 125.49, 124.74, 123.33, 121.86 (t, *J* = 24.8 Hz), 112.66 (t, *J* = 248.7 Hz), 63.23, 14.03.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -102.99 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{16}H_{14}F_2O_2Na$: 299.0854, found: 299.0851.

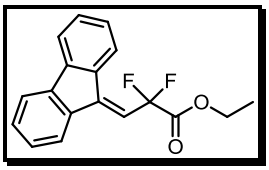



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.41 – 7.39 (m, 3H), 7.37 – 7.32 (m, 3H), 7.31 – 7.27 (m, 2H), 7.27 – 7.20 (m, 2H), 6.30 (t, *J* = 11.8 Hz, 1H), 3.93 (q, *J* = 7.2 Hz, 2H), 1.20 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.49 (t, *J* = 34 Hz), 151.01 (t, *J* = 9.0 Hz), 140.50, 137.10, 129.86, 129.11, 128.59, 128.41, 128.01, 127.91, 119.50 (t, *J* = 28 Hz), 112.56 (t, *J* = 245 Hz), 62.77, 13.69.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -90.96 (d, *J* = 11.9 Hz, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{18}H_{17}F_2O_2$: 303.1191, found: 303.1186.

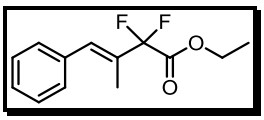



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 8.14 (d, *J* = 7.8 Hz, 1H), 7.66 (t, *J* = 7.4 Hz, 3H), 7.46 – 7.39 (m, 2H), 7.35 – 7.29 (m, 2H), 6.67 (t, *J* = 15.8 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.34 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 163.57 (t, *J* = 34.8 Hz), 143.87 (t, *J* = 7.6 Hz), 142.29, 140.18, 138.10, 134.00, 130.44, 130.19, 127.77, 127.51, 127.20 (t, *J* = 7.4 Hz), 121.03, 119.78, 119.75, 115.19 (t, *J* = 29.4 Hz), 112.91 (t, *J* = 248.0 Hz), 63.46, 13.93.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -96.01 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{18}H_{15}F_2O_2$: 301.1035, found: 301.1032.

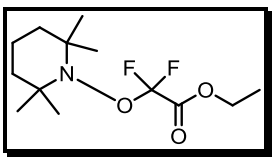



**$^{1}$H NMR** (500 MHz, $CDCl_3$) δ = 7.38 (t, *J* = 7.6 Hz, 2H), 7.35 – 7.27 (m, 3H), 6.95 (s, 1H), 4.36 (q, *J* = 7.1 Hz, 2H), 1.99 (s, 3H), 1.36 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (125 MHz, $CDCl_3$) δ = 164.05 (t, *J* = 35.2 Hz), 135.23, 131.01 (t, *J* = 9.2 Hz), 129.21, 128.39, 127.96, 114.42 (t, *J* = 251.3 Hz), 63.03, 14.00, 12.56 (t, *J* = 2.8 Hz).

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -106.62 (s, 2F).

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{14}F_2O_2Na$: 263.0854, found: 263.0854.



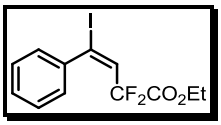

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 4.37 (q, *J* = 7.1 Hz, 2H), 1.64 – 1.54 (m, 5H), 1.39 (t, *J* = 7.1 Hz,

4H), 1.21 (dd, *J* = 7.3, 5.0 Hz, 12H).

**$^{13}$C NMR** (100 MHz, $CDCl_3$) δ = 160.74 (t, *J* = 42.7 Hz), 115.54 (t, *J* = 267.6 Hz), 62.99, 61.39, 40.21, 33.41 (t, *J* = 4.3 Hz), 20.76, 16.92, 13.92.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -73.45 (s, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{24}NF_2O_3$: 280.1719, found: 280.1714.

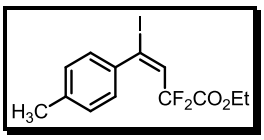



**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ = 7.38 – 7.29 (m, 5H), 6.75 (t, *J* = 10.9 Hz, 1H), 3.99 (q, *J* = 7.2 Hz, 2H), 1.22 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.54 (t, *J* = 34 Hz), 140.69, 133.05 (t, *J* = 28.5 Hz), 129.46, 128.51, 128.07, 127.84 (t, *J* = 1.5 Hz), 110.87 (t, *J* = 250 Hz), 63.14, 13.71.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.79 (*E*, 2F), -98.07 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}F_2O_2I$: 352.9845, found: 352.9842.

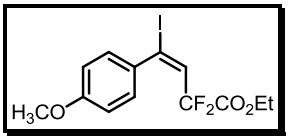



**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.22 (d, *J* = 8.2 Hz, 2H), 7.14 (d, *J* = 7.9 Hz, 2H), 6.71 (t, *J* = 10.9 Hz, 1H), 4.00 (q, *J* = 7.2 Hz, 2H), 2.36 (s, 3H), 1.22 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.61 (t, *J* = 34 Hz), 139.69, 137.88, 132.72 (t, *J* = 28.5 Hz), 129.15, 128.72, 127.86, 110.91 (t, *J* = 250.7 Hz), 63.12, 21.37, 13.70.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.27 (*E*, 2F), -97.56 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{14}F_2O_2I$: 367.0001, found: 366.9998.




**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 7.31 – 7.26 (m, 2H), 6.86 – 6.82 (m, 2H), 6.69 (t, *J* = 10.8 Hz, 1H), 4.01 (q, *J* = 7.2 Hz, 2H), 3.83 (s, 3H), 1.22 (t, *J* = 7.2 Hz, 3H).

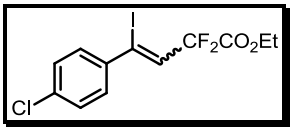
**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.48 (d, *J* = 8.9, 2H), 6.88 (d, *J* = 8.9, 2H), 6.62 (d, *J* = 11.9,

1H), 4.42 (q, *J* = 7.1, 2H), 3.86 (s, 3H), 1.41 (t, *J* = 7.1, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.63 (t, *J* = 33.4 Hz), 160.32, 132.99, 132.52 (t, *J* = 28.5 Hz), 129.72, 128.39 (t, *J* = 30 Hz), 113.37, 110.93 (t, *J* = 251 Hz), 63.14, 55.36, 13.73.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.68 (*E*, 2F), -97.83 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{14}F_2O_3I$: 382.9950, found: 382.9946.



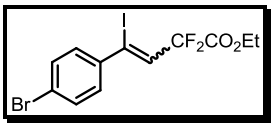

**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.34 – 7.31 (m, 2H), 7.28 – 7.25 (m, 2H), 6.74 (t, *J* = 11.3 Hz, 1H), 4.10 (q, *J* = 7.2 Hz, 2H), 1.26 (t, *J* = 7.2 Hz, 3H).

**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.46 (d, *J* = 8.6, 2H), 7.36 (d, *J* = 8.7, 2H), 6.69 (d, *J* = 11.6, 1H), 4.43 (q, *J* = 7.1, 2H), 1.42 (t, *J* = 7.1, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.54 (t, *J* = 33.4 Hz), 139.23, 135.41, 133.44 (t, *J* = 28 Hz), 129.15, 128.33, 110.86 (t, *J* = 252 Hz), 106.99 (t, *J* = 9.4 Hz), 63.37, 13.76.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.63 (*E*, 2F), -98.25 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}ClF_2O_2I$: 386.9455, found: 386.9448.



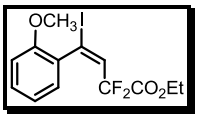

**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.48 (d, *J* = 8.5 Hz, 2H), 7.20 (d, *J* = 8.5 Hz, 2H), 6.74 (t, *J* = 11.3 Hz, 1H), 4.10 (q, *J* = 7.2 Hz, 2H), 1.26 (t, *J* = 7.2 Hz, 3H).

**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.51 (d, *J* = 8.6, 2H), 7.39 (d, *J* = 8.6, 2H), 6.69 (d, *J* = 11.6, 1H), 4.42 (q, *J* = 7.1, 2H), 1.42 (t, *J* = 7.1, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.54(t, *J* = 33.4 Hz), 139.71, 133.41 (t, *J* = 28 Hz), 131.30, 129.34, 123.68, 110.87 (t, *J* = 252 Hz), 106.96, 63.39, 13.77.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.67 (*E, 2F*), -98.29 (*Z, 2F*).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}BrF_2O_2I$: 430.8950, found: 430.8945.

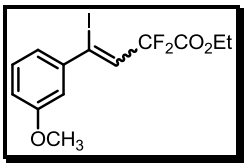



**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.35 – 7.31 (m, 1H), 7.17 (dd, *J*= 7.6, 1.6 Hz, 1H), 6.94 (td, *J* = 7.5, 0.9 Hz, 1H), 6.87 (d, *J* = 8.3 Hz, 1H), 6.76 (t, *J* = 11.0 Hz, 1H), 4.05 (q, *J* = 7.2 Hz, 2H), 3.88 (s, 3H), 1.27 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.57 (t, *J* = 33.4 Hz), 155.22, 133.95 (t, *J* = 28 Hz), 130.98, 129.16, 129.05, 120.08, 111.02, 110.94 (t, *J* = 252 Hz), 103.72 (t, *J* = 10 Hz), 62.98, 55.58, 13.75.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -97.05 (*E*, 2F), -98.59 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{14}F_2O_3I$: 382.9950, found: 382.9943.

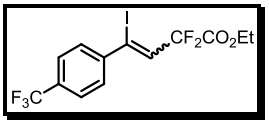



**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.25 (t, *J* = 7.9 Hz, 1H), 6.93 – 6.90 (m, 1H), 6.88 – 6.86 (m, 1H), 6.85 – 6.81 (m, 1H), 6.72 (t, *J* = 10.9 Hz, 1H), 4.01 (q, *J* = 7.2 Hz, 2H), 3.83 (s, 3H), 1.23 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.54 (t, *J* = 33.4 Hz), 158.83, 141.73, 133.03 (t, *J* = 28 Hz), 129.18, 120.30, 115.45, 113.11, 110.87 (t, *J* = 252 Hz), 108.40 (t, *J* = 10.4 Hz), 63.17, 55.33, 13.69.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.74 (*E*, 2F), -98.09 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{14}F_2O_3I$: 382.9950, found: 382.9945.

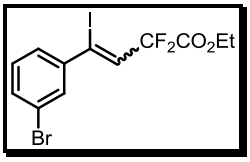



**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.57 (d, *J* = 8.2 Hz, 2H), 7.39 (d, *J* = 8.1 Hz, 2H), 6.74 (t, *J* = 11.5 Hz, 1H), 4.07 (q, *J* = 7.2 Hz, 2H), 1.22 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.50 (t, *J* = 33.4 Hz), 144.33, 133.78 (t, *J* = 28 Hz), 131.04, 128.05, 125.10 (q, *J* = 3.7 Hz), 122.55, 110.87 (t, *J* = 252 Hz), 106.01 (t, *J* = 8.9 Hz), 63.44, 13.73.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -62.82 (*Z*, 3F), -62.92 (*E*, 3F), -95.28 (*E*, 2F), -98.65 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{11}F_5O_2I$: 420.9718, found: 420.9716.

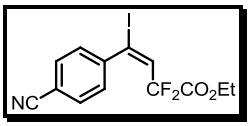



**$^{1}$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.48 – 7.44 (m, 2H), 7.27 – 7.19 (m, 2H), 6.74 (t, *J* = 11.2 Hz, 1H), 4.11 (q, *J* = 7.2 Hz, 2H), 1.29 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.46 (t, *J* = 33.4 Hz), 142.54, 133.81 (t, *J* = 28 Hz), 132.39, 130.47, 129.63, 126.38, 121.82, 110.81 (t, *J* = 252 Hz), 105.86 (t, *J* = 9.5 Hz), 63.43, 13.78.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.78(*E*, 2F), -98.44 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{14}BrF_2O_2I$: 430.8950, found: 430.8947.

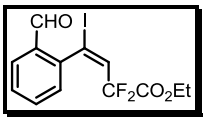



**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 7.65 (d, *J* = 8.6 Hz, 2H), 7.42 (d, *J* = 8.4 Hz, 2H), 6.77 (t, *J* = 11.9 Hz, 1H), 4.19 (q, *J* = 7.2 Hz, 2H), 1.30 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.39 (t, *J* = 33.4 Hz), 145.34, 133.86 (t, *J* = 28 Hz), 131.86, 128.30, 118.06, 113.00, 110.88 (t, *J* = 252 Hz), 105.12, 63.56, 13.82.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.94 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{11}NF_2O_2I$: 377.9797, found: 377.9792.



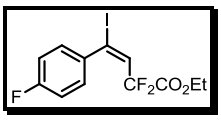

**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 10.27 (s, 1H), 7.91 (dd, *J* = 7.7 Hz, 1.3, 1H), 7.60 (td, *J* = 7.6, 1.4 Hz, 1H), 7.51 (td, *J* = 7.6, 0.7 Hz, 1H), 7.28 (t, *J* = 3.4 Hz, 1H), 6.88 (t, *J* = 11.5 Hz, 1H), 4.21 – 4.10 (m, 2H), 1.28 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 190.14, 162.34 (t, *J* = 33.4 Hz), 142.90, 134.70 (t, *J* = 28 Hz), 133.57, 131.07, 129.77, 129.39, 128.39, 110.97 (t, *J* = 252 Hz), 102.94 (t, *J* = 10 Hz), 63.47,

13.75.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -97.27 (*E*, 1F), -97.46 (*E*, 1F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{12}F_2O_3I$: 380.9794, found: 380.9789.

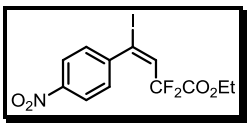



**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 7.37 – 7.29 (m, 2H), 7.06 – 7.00 (m, 2H), 6.74 (t, *J* = 11.2 Hz, 1H), 4.08 (q, *J* = 7.2 Hz, 2H), 1.25 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.90 (d, *J* = 252 Hz), 162.53 (t, *J* = 33.4 Hz), 136.87, 133.41(t, *J* = 28 Hz), 129.93 (d, *J* = 8.5 Hz), 115.29 (d, *J* = 23 Hz), 110.85 (t, *J* = 252 Hz), 107.32 (t, *J* = 9.7 Hz), 63.27, 13.74.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.34 (*E*, 2F), -98.16 (*Z*, 2F), -110.59 (*E*, F), -110.84 (*Z*, F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}F_3O_2I$: 370.9750, found: 370.9745.

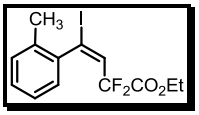



**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 8.22 (d, *J* = 8.7 Hz, 2H), 7.48 (d, *J* = 8.7 Hz, 2H), 6.80 (t, *J* = 12.0 Hz, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 1.36 – 1.26 (m, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.37 (t, *J* = 33.4 Hz), 147.19, 134.04 (t, *J* = 28 Hz), 132.98, 128.56, 123.33, 110.92 (t, *J* = 252 Hz), 104.50 (t, *J* = 8.3 Hz), 63.61, 13.83.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -96.27 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}F_2NO_4I$: 397.9695, found: 397.9691.



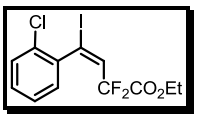

**$^{1}$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 7.24 (d, *J* = 7.3 Hz, 1H), 7.18 (t, *J* = 7.0 Hz, 2H), 7.12 (d, *J* = 7.5 Hz, 1H), 6.78 (t, *J* = 10.6 Hz, 1H), 4.01 (q, *J* = 7.1 Hz, 2H), 2.30 (s, 3H), 1.25 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.52 (t, *J* = 33.4 Hz), 139.69, 134.82, 133.74 (t, *J* = 28 Hz), 130.34, 129.42, 127.23, 125.52, 110.77 (t, *J* = 250 Hz), 107.93 (t, *J* = 9.9 Hz), 63.13, 19.45,

13.70.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.39, -96.12, -97.44, -98.16.

**HRMS** (ESI) (m/z): $[M+Na]^+$ calcd. for $C_{13}H_{13}F_2O_2INa$: 388.9821, found: 388.9815.

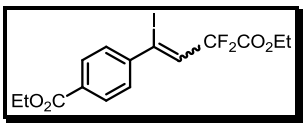



**$^1$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 7.41 – 7.36 (m, 1H), 7.31 – 7.27 (m, 2H), 7.26 – 7.23 (m, 1H), 6.81 (t, *J* = 11.4 Hz, 1H), 4.21 – 4.13 (m, 2H), 1.30 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 162.31 (t, *J* = 33.4 Hz), 138.89, 134.66 (t, *J* = 28 Hz), 131.44, 130.46, 129.81, 128.92, 126.58, 110.87 (t, *J* = 252 Hz), 103.38 (t, *J* = 9.0 Hz), 63.34, 13.80.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -97.96 (*E*, 2F), -99.39 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}F_2O_2ICl$: 386.9455, found: 386.9456.

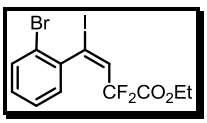



**$^1$H NMR** (*E*) (400 MHz, $CDCl_3$) δ = 8.02 (d, *J* = 8.5 Hz, 2H), 7.38 (d, *J* = 8.4 Hz, 2H), 6.76 (t, *J* = 11.4 Hz, 1H), 4.40 (q, *J* = 7.1 Hz, 2H), 4.09 (q, *J* = 7.2 Hz, 2H), 1.41 (t, *J* = 7.1 Hz, 3H), 1.26 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*E*) (101 MHz, $CDCl_3$) δ = 165.71, 162.47 (t, *J* = 33.4 Hz), 145.00, 133.46 (t, *J* = 28 Hz), 131.10, 129.27, 127.66, 110.87 (t, *J* = 252 Hz), 106.80 (t, *J* = 9.4 Hz), 63.36, 61.26, 14.30, 13.76.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.11 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{15}H_{16}F_2O_4I$: 425.0056, found: 425.0040.

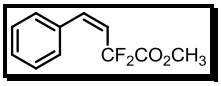



**$^1$H NMR** (*E*) (500 MHz, $CDCl_3$) δ = 7.58 (d, *J* = 8.1 Hz, 1H), 7.33 (t, *J* = 7.4 Hz, 1H), 7.25 (d, *J* = 7.6 Hz, 1H), 7.20 (t, *J* = 7.7 Hz, 1H), 6.78 (t, *J* = 11.4 Hz, 1H), 4.19 (dd, *J* = 13.5, 6.6 Hz, 2H), 1.31 (t, *J* = 6.9 Hz, 3H).

**$^{13}$C NMR** (*E*) (126 MHz, $CDCl_3$) δ = 162.31 (t, *J* = 33.4 Hz), 140.75, 134.28 (t, *J* = 28 Hz), 133.01, 130.49, 128.89, 127.18, 121.08, 110.89 (t, *J* = 252 Hz), 105.57 (t, *J* = 8.8 Hz), 63.37, 13.84.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -98.02 (*E*, 1F), -98.19 (*E*, 1F), -98.90 (*Z*, 1F), -99.49 (*Z*, 1F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{11}F_2O_2IBr$: 430.8950, 432,8929, found: 430.8942, 432,8921.

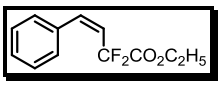



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.40 – 7.33 (m, 5H), 6.99 (d, *J* = 12.5 Hz, 1H), 5.90 (q, *J* = 12.9 Hz, 1H), 3.61 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.91 (t, *J* = 34 Hz), 138.92 (t, *J* = 8.8 Hz), 134.18, 128.86 (t, *J* = 3.3 Hz), 128.23, 127.48, 121.88 (t, *J* = 27.7 Hz), 112.25 (t, *J* = 247 Hz), 53.28.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.16 (*Z*, 2F), -103.11 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{11}H_{11}F_2O_2$: 213.0722, found: 213.0720.

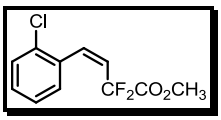



**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.39 – 7.34 (m, 5H), 6.98 (d, *J* = 12.6 Hz, 1H), 5.90 (q, *J* = 12.9 Hz, 1H), 4.05 (q, *J* = 7.1 Hz, 2H), 1.15 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.42 (t, *J* = 34 Hz), 138.76 (t, *J* = 8.9 Hz), 134.27, 128.93 (t, *J* = 2.7 Hz), 128.75, 128.23, 121.96 (t, *J* = 27.7 Hz), 112.28 (t, *J* = 247 Hz), 62.95, 13.62.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.94 (*Z*, 2F), -103.24 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_2$: 227.0878, found: 227.0876.



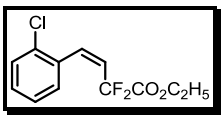

**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.44 – 7.34 (m, 2H), 7.33 – 7.25 (m, 2H), 7.06 (d, *J* = 12.3 Hz, 1H), 6.03 (q, *J* = 12.3 Hz, 1H), 3.63 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.61 (t, *J* = 34 Hz), 136.10 (t, *J* = 8.9 Hz), 133.10, 132.96, 130.95 (t, *J* = 3.3 Hz), 130.02, 129.02, 126.48, 123.62 (t, *J* = 27.7 Hz), 112.04 (t, *J* = 247 Hz),

53.30.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.08 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{11}H_{10}ClF_2O_2$: 247.0332, found: 247.0329.

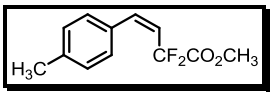



$^1$H NMR (*Z*) (500 MHz, $CDCl_3$) δ = 7.42 – 7.37 (m, 2H), 7.33 – 7.24 (m, 2H), 7.06 (d, *J* = 12.3 Hz, 1H), 6.03 (q, *J* = 12.3 Hz, 1H), 4.04 (q, *J* = 7.2 Hz, 2H), 1.20 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.13 (t, *J* = 34 Hz), 135.87 (t, *J* = 8.8 Hz), 133.19, 132.99, 130.99 (t, *J* = 3.5 Hz), 130.03, 129.02, 126.49, 123.68 (t, *J* = 27.7 Hz), 112.07 (t, *J* = 247 Hz), 63.05, 13.61.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.72 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}ClF_2O_2$: 261.0488, found: 261.0484.

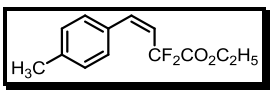



**$^1$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.29 – 7.24 (m, 2H), 7.21 – 7.17 (m, 2H), 6.94 (d, *J* = 12.6 Hz, 1H), 5.84 (q, *J* = 13.1 Hz, 1H), 3.64 (s, 3H), 2.37 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 164.02 (t, *J* = 34 Hz), 138.94 (t, *J* = 8.8 Hz), 131.30, 129.58, 128.94, 127.42, 120.94 (t, *J* = 27.7 Hz), 112.37 (t, *J* = 247 Hz), 53.29, 21.31.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.19 (*Z*, 2F), -102.85 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_2$: 227.0878, found: 227.0874.

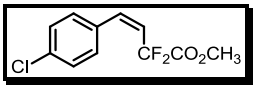



**$^1$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.28 (d, *J* = 8.0 Hz, 2H), 7.17 (d, *J* = 8.0 Hz, 2H), 6.93 (d, *J* = 12.6 Hz, 1H), 5.84 (q, *J* = 13.2 Hz, 1H), 4.08 (q, *J* = 7.1 Hz, 2H), 2.37 (s, 3H), 1.17 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.53 (t, *J* = 34 Hz), 138.78 (t, *J* = 8.8 Hz), 131.39, 129.57, 128.93, 127.42, 121.04 (t, *J* = 27.7 Hz), 112.40 (t, *J* = 247 Hz), 62.92, 21.30, 13.63.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.01 (*Z*, 2F), -102.99 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_2$: 241.1035, found: 241.1030.

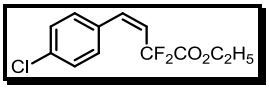



**$^1$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.42 – 7.29 (m, 4H), 6.91 (d, *J* = 12.6 Hz, 1H), 5.90 (q, *J* = 13.2 Hz, 1H), 3.70 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.88 (t, *J* = 34 Hz), 137.66 (t, *J* = 8.3 Hz), 134.79, 132.55, 130.31 (t, *J* = 3.0 Hz), 128.45, 122.21 (t, *J* = 27.7 Hz), 112.13 (t, *J* = 247 Hz), 53.47.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.17 (*Z*, 2F), -103.22 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{11}H_{10}ClF_2O_2$: 247.0332, found: 247.0328.

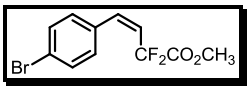



**$^1$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.38 – 7.30 (m, 4H), 6.90 (dt, *J* = 12.6, 1.7 Hz, 1H), 5.90 (q, *J* = 13.2 Hz, 1H), 4.14 (q, *J* = 7.1 Hz, 2H), 1.21 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.38 (t, *J* = 34 Hz), 137.49 (t, *J* = 8.4 Hz), 134.78, 132.64, 130.37, 128.44, 122.35 (t, *J* = 27.7 Hz), 112.16 (t, *J* = 247 Hz), 63.13, 13.71.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.03 (*Z*, 2F), -103.36 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}ClF_2O_2$: 261.0488, found: 261.0486.

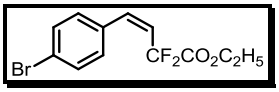



**$^1$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.50 (d, *J* = 8.5 Hz, 2H), 7.24 (d, *J* = 8.4 Hz, 2H), 6.89 (d, *J* = 12.6 Hz, 1H), 5.91 (q, *J* = 13.1 Hz, 1H), 3.70 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.86 (t, *J* = 34 Hz), 137.69 (t, *J* = 8.2 Hz), 133.01, 131.41, 130.54 (t, *J* = 3.0 Hz), 123.05, 122.28 (t, *J* = 27.7 Hz), 112.13 (t, *J* = 247 Hz), 53.49.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.22 (*Z*, 2F), -103.26 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{11}H_{10}BrF_2O_2$: 290.9827, 292.9806, found: 290.9823, 292.9801.

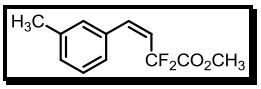



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.50 (d, *J* = 8.5 Hz, 2H), 7.25 (d, *J* = 8.4 Hz, 2H), 6.88 (d, *J* = 12.6 Hz, 1H), 5.91 (1, *J* = 13.2 Hz, 1H), 4.14 (q, *J* = 7.1 Hz, 2H), 1.21 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.37 (t, *J* = 34 Hz), 137.53 (t, *J* = 8.3 Hz), 133.10, 131.41, 130.60 (t, *J* = 3.0 Hz), 123.04, 122.43 (t, *J* = 27.7 Hz), 112.15 (t, *J* = 247 Hz), 63.15, 13.71.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -95.08 (*Z*, 2F), -103.40 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}BrF_2O_2$: 304.9983, 306.9963, found: 304.9977, 306.9957.

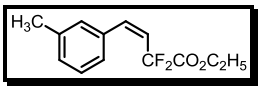



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.29 – 7.24 (m, 2H), 7.15 (d, *J* = 6.9 Hz, 2H), 6.96 (d, *J* = 12.5 Hz, 1H), 5.88 (q, *J* = 12.8 Hz, 1H), 3.59 (s, 3H), 2.37 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.91 (t, *J* = 34 Hz), 139.03 (t, *J* = 9.0 Hz), 137.88, 134.12, 129.52 (t, *J* = 2.5 Hz), 129.47, 128.15, 125.86 (t, *J* = 2.8 Hz), 121.70 (t, *J* = 27.7 Hz), 112.27 (t, *J* = 247 Hz), 53.21, 21.33.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.78 (*Z*, 2F), -103.06 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_2$: 227.0878, found: 227.0875.

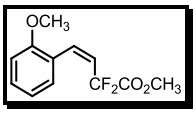



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.28 – 7.24 (m, 2H), 7.17 – 7.14 (m, 2H), 6.95 (d, *J* = 12.6 Hz, 1H), 5.88 (q, *J* = 12.8 Hz, 1H), 4.04 (q, *J* = 7.2 Hz, 2H), 2.37 (s, 3H), 1.14 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.41 (t, *J* = 34 Hz), 138.87 (t, *J* = 9.1 Hz), 137.88, 134.22, 129.57 (t, *J* = 2.5 Hz), 129.48, 128.16, 125.96 (t, *J* = 2.8 Hz), 121.78 (t, *J* = 27.7 Hz), 112.31 (t, *J* = 247 Hz), 62.89, 21.33, 13.58.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.59 (*Z*, 2F), -103.18 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_2$: 241.0878, found: 241.0872.

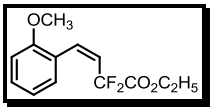



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.35 – 7.31 (m, 1H), 7.30 – 7.28 (m, 1H), 7.07 (d, *J* = 12.4 Hz, 1H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.88 (d, *J* = 8.3 Hz, 1H), 5.92 (q, *J* = 12.5 Hz, 1H), 3.85 (s, 3H), 3.59 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.96 (t, *J* = 34 Hz), 156.81, 134.86 (t, *J* = 8.9 Hz), 130.47 (t, *J* = 2.5 Hz), 130.33, 123.41, 121.96 (t, *J* = 27.7 Hz), 120.17, 112.47 (t, *J* = 247 Hz), 110.07, 55.46, 53.13.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.73 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_3$: 243.0827, found: 243.0824.

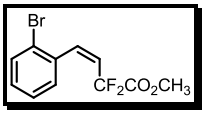



**$^{1}$H NMR** (*Z*) (400 MHz, $CDCl_3$) δ = 7.35 – 7.31 (m, 2H), 7.07 (d, *J* = 12.4 Hz, 1H), 6.94 (t, *J* = 7.5 Hz, 1H), 6.87 (d, *J* = 8.2 Hz, 1H), 5.92 (q, *J* = 12.5 Hz, 1H), 4.01 (q, *J* = 7.1 Hz, 2H), 3.85 (s, 3H), 1.16 (t, *J* = 7.1 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.19 (t, *J* = 34 Hz), 156.86, 134.69 (t, *J* = 9.1 Hz), 130.53 (t, *J* = 2.5 Hz), 130.36, 123.50, 121.96 (t, *J* = 27.7 Hz), 120.17, 112.50 (t, *J* = 247 Hz), 110.02, 62.78, 55.41, 13.57.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.29 (*Z*, 2F), -102.92 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_3$: 257.0984, found: 257.0980.

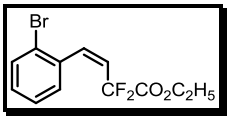



**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.60 (dd, *J* = 8.0, 0.9 Hz, 1H), 7.37 – 7.31 (m, 2H), 7.25 – 7.19 (m, 1H), 7.00 (d, *J* = 12.3 Hz, 1H), 6.01 (q, *J* = 12.1 Hz, 1H), 3.62 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.56 (t, *J* = 34 Hz), 138.05 (t, *J* = 8.9 Hz), 134.83, 132.16, 131.04 (t, *J* = 3.2 Hz), 130.15, 127.09, 123.36 (t, *J* = 27.7 Hz), 122.92, 112.00 (t, *J* = 247 Hz), 53.31.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.86 (*Z*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{11}H_{10}BrF_2O_2$: 290.9827, 292.9806, found: 290.9822, 292.9801.

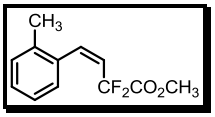



**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.59 (dd, *J* = 8.0, 1.0 Hz, 1H), 7.39 (d, *J* = 7.2 Hz, 1H), 7.32 (td, *J* = 7.5, 0.9 Hz, 1H), 7.22 (td, *J* = 7.6, 1.4 Hz, 1H), 7.00 (d, *J* = 12.2 Hz, 1H), 6.01 (q, *J* = 12.2 Hz, 1H), 4.03 (q, *J* = 7.2 Hz, 2H), 1.21 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.10 (t, *J* = 34 Hz), 137.85 (t, *J* = 8.9 Hz), 134.83, 132.18, 131.07 (t, *J* = 3.3 Hz), 130.15, 127.10, 123.40 (t, *J* = 22.7 Hz), 123.07, 112.03 (t, *J* = 247 Hz), 63.06, 13.65.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -94.52 (*Z*, 2F), -103.11 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{12}BrF_2O_2$: 304.9983, 306.9963, found: 304.9977, 306.9957.

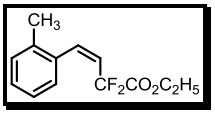



**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.27 – 7.23 (m, 1H), 7.19 (d, *J* = 4.8 Hz, 3H), 7.04 (d, *J* = 12.2 Hz, 1H), 5.99 (q, *J* = 11.9 Hz, 1H), 3.46 (s, 3H), 2.28 (s, 3H).

**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.69 (t, *J* = 34 Hz), 138.35 (t, *J* = 9.7 Hz), 135.98, 133.73, 129.49, 129.21 (t, *J* = 2.7 Hz), 128.78, 125.55, 123.09 (t, *J* = 22.7 Hz), 112.22 (t, *J* = 247 Hz), 53.03, 19.79.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.86 (*Z*, 2F), -103.03 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{12}H_{13}F_2O_2$: 227.0878, found: 227.0874.



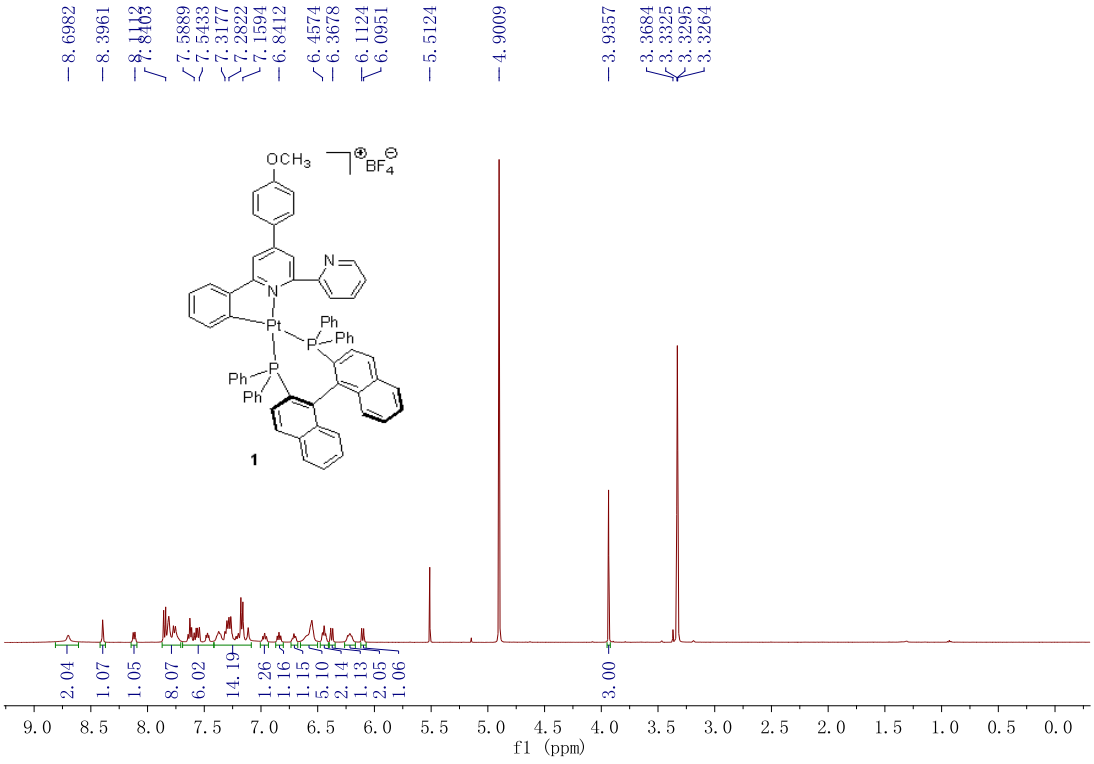

**$^{1}$H NMR** (*Z*) (500 MHz, $CDCl_3$) δ = 7.27 – 7.16 (m, 4H), 7.03 (d, *J* = 12.2 Hz, 1H), 5.99 (q, *J* = 11.7 Hz, 1H), 3.89 (q, *J* = 7.2 Hz, 2H), 2.29 (s, 3H), 1.14 (t, *J* = 7.2 Hz, 3H).

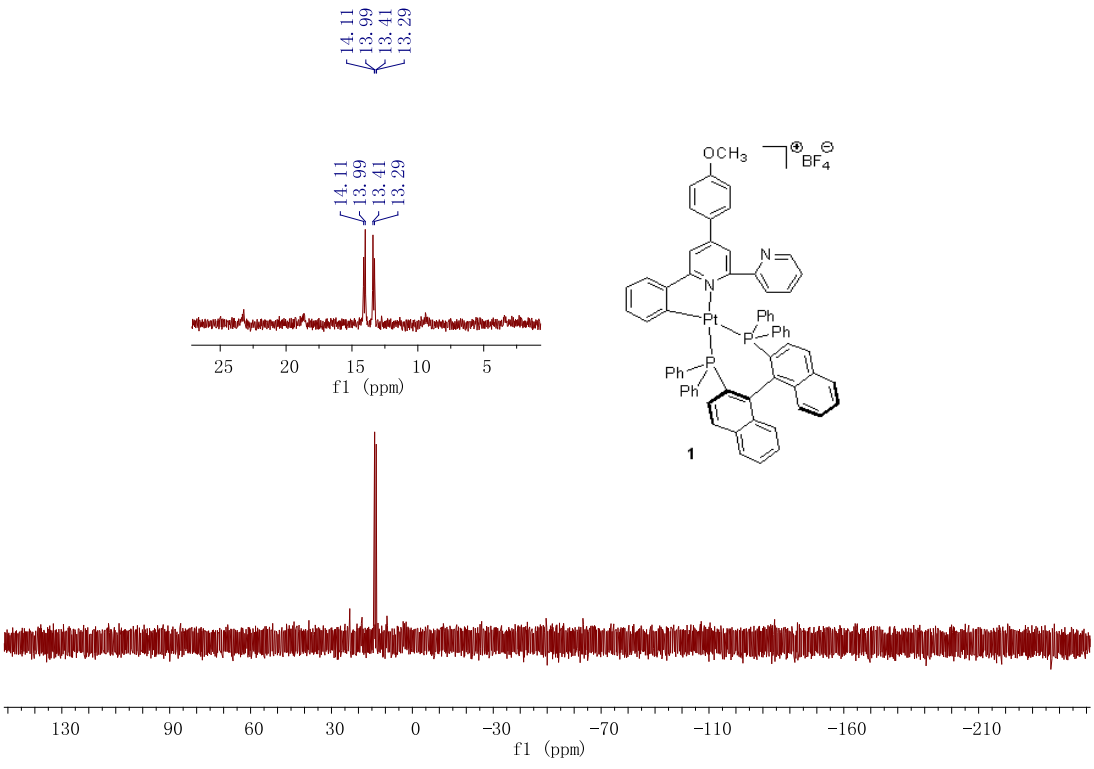
**$^{13}$C NMR** (*Z*) (126 MHz, $CDCl_3$) δ = 163.28 (t, *J* = 34 Hz), 138.10 (t, *J* = 9.5 Hz), 135.99, 133.83, 129.50, 129.20 (t, *J* = 2.8 Hz), 128.77, 125.55, 123.04 (t, *J* = 22.7 Hz), 112.26 (t, *J* = 247 Hz), 62.79, 19.87, 13.56.

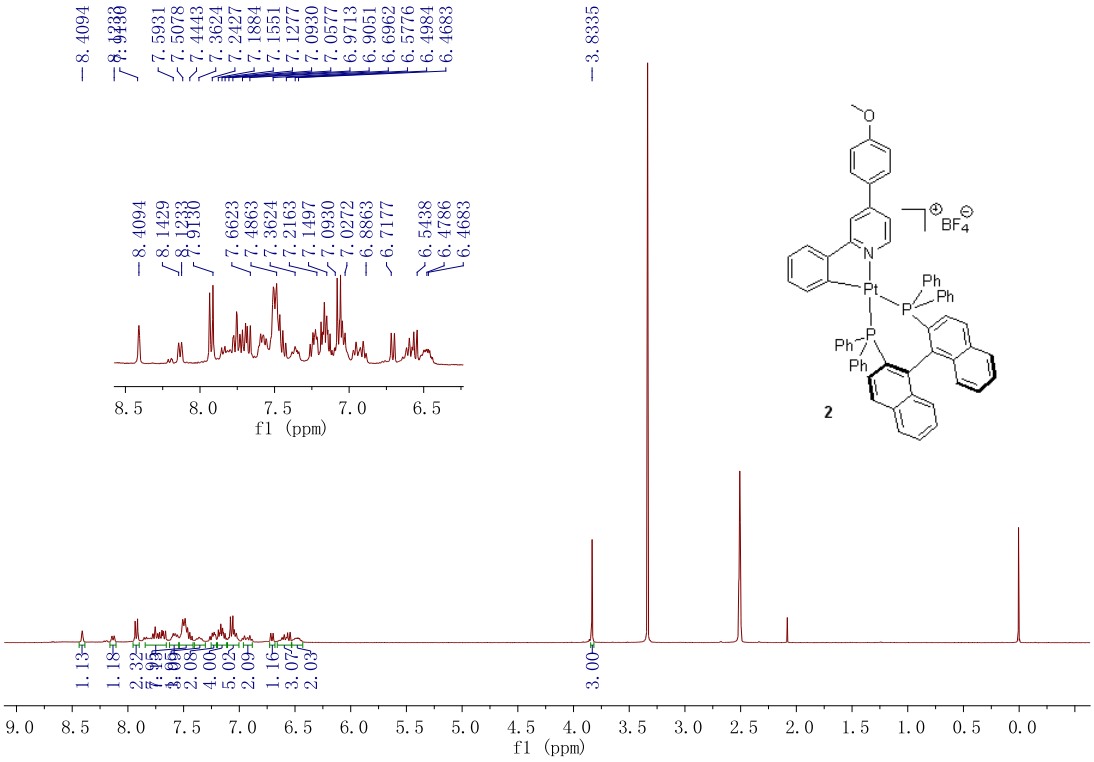
**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ = -93.71 (*Z*, 2F), -103.09 (*E*, 2F).

**HRMS** (ESI) (m/z): $[M+H]^+$ calcd. for $C_{13}H_{15}F_2O_2$: 241.0878, found: 241.0872.

# 3. NMR spectra

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6.5776
6.4984
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3.8335
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6.4683
f1 (ppm)
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2.32
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3.07
2.03
3.00
f1 (ppm)
BF4
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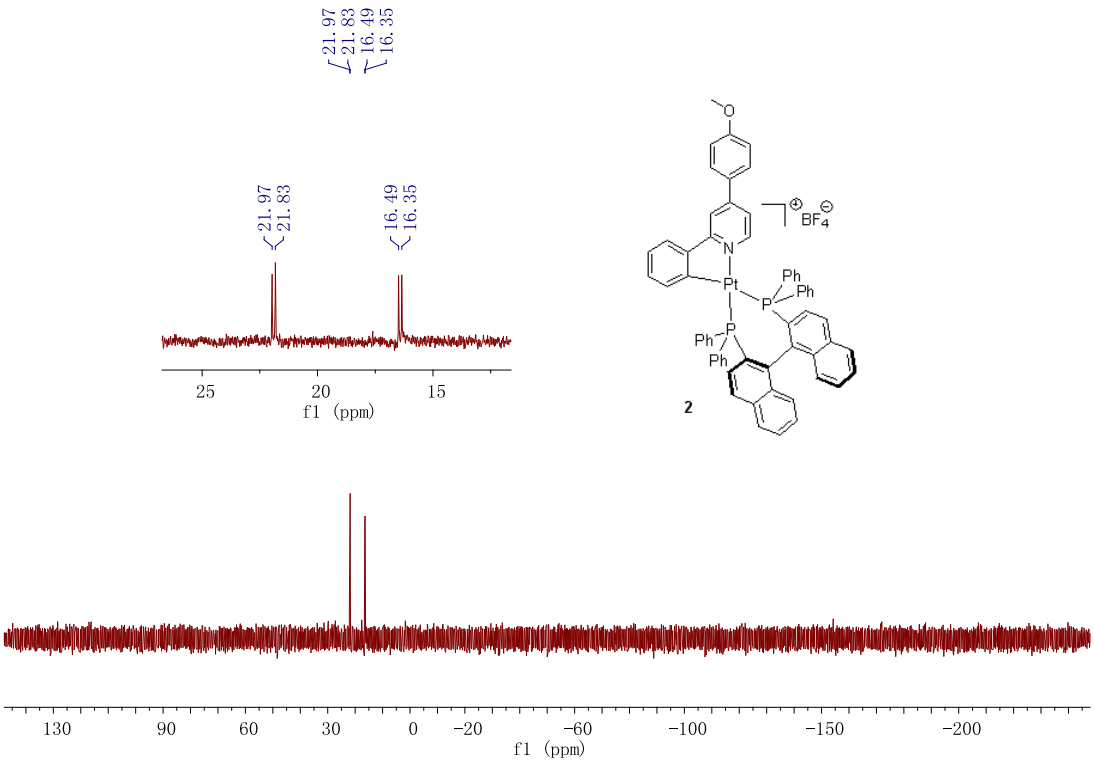
Pt
P
Ph
2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f1 (ppm)
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Pt
P
Ph
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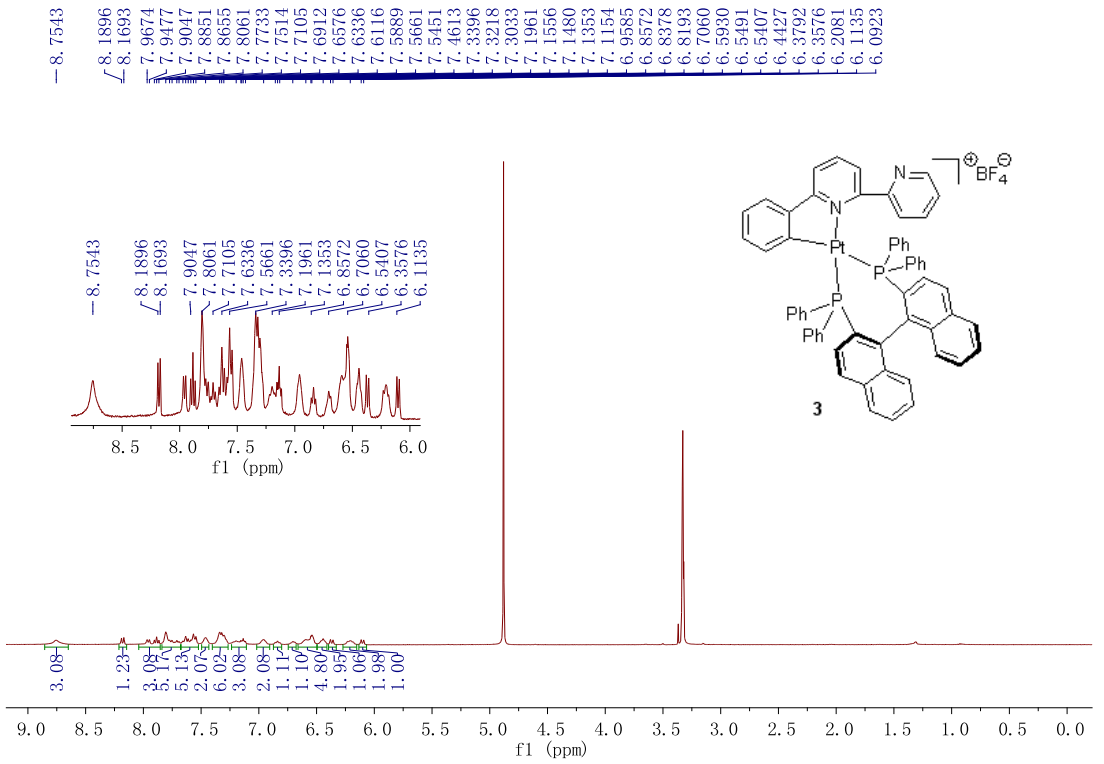
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3.08
1.23
3.08
5.13
2.07
6.02
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1.95
1.06
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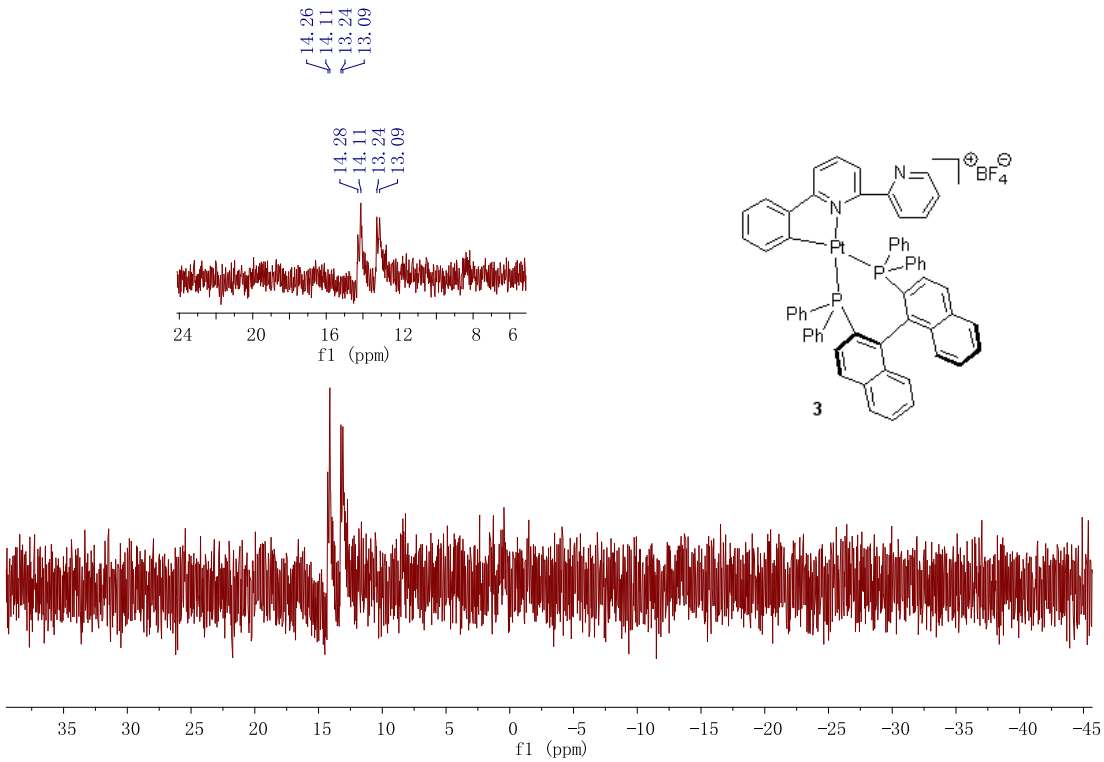
1.00
f1 (ppm)
3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13.09
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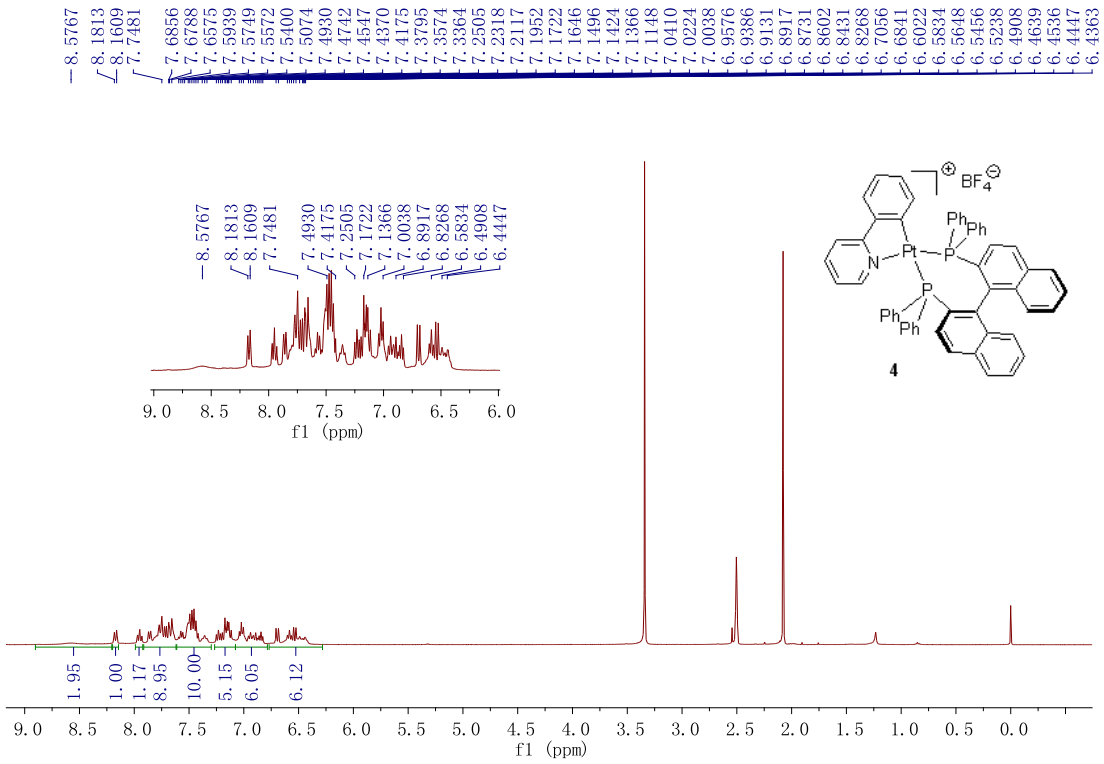
3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6.4363
BF4
Ph
Pt
P
N
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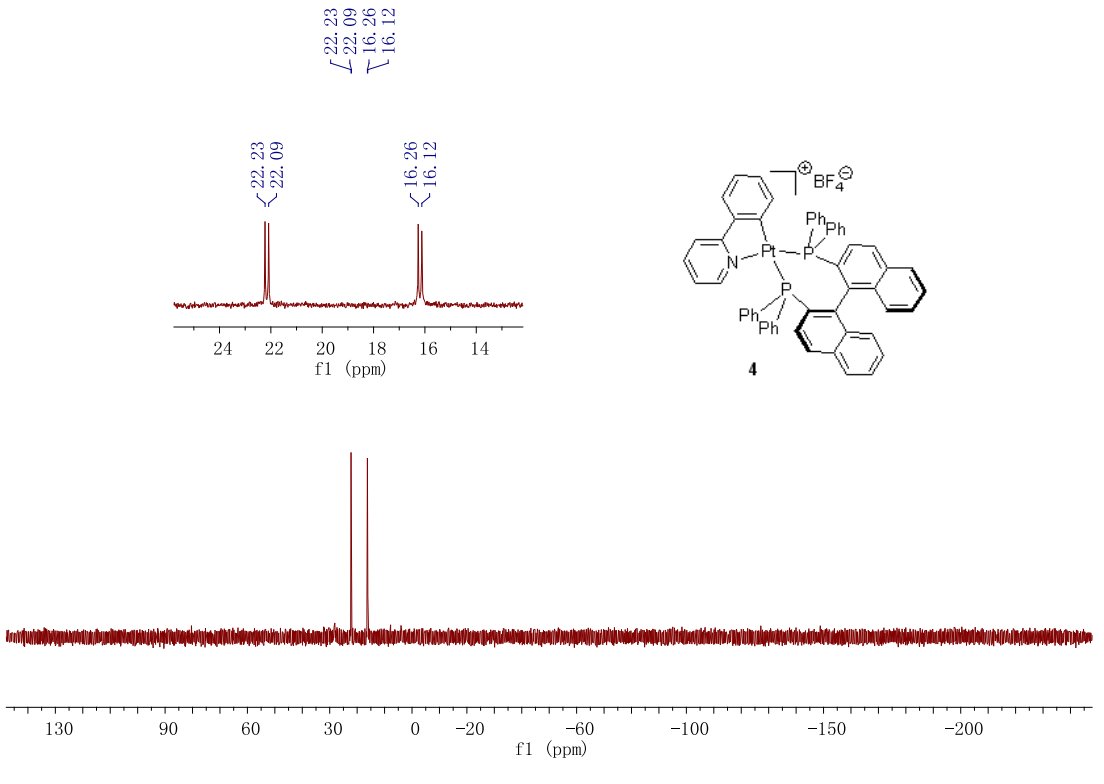
6.12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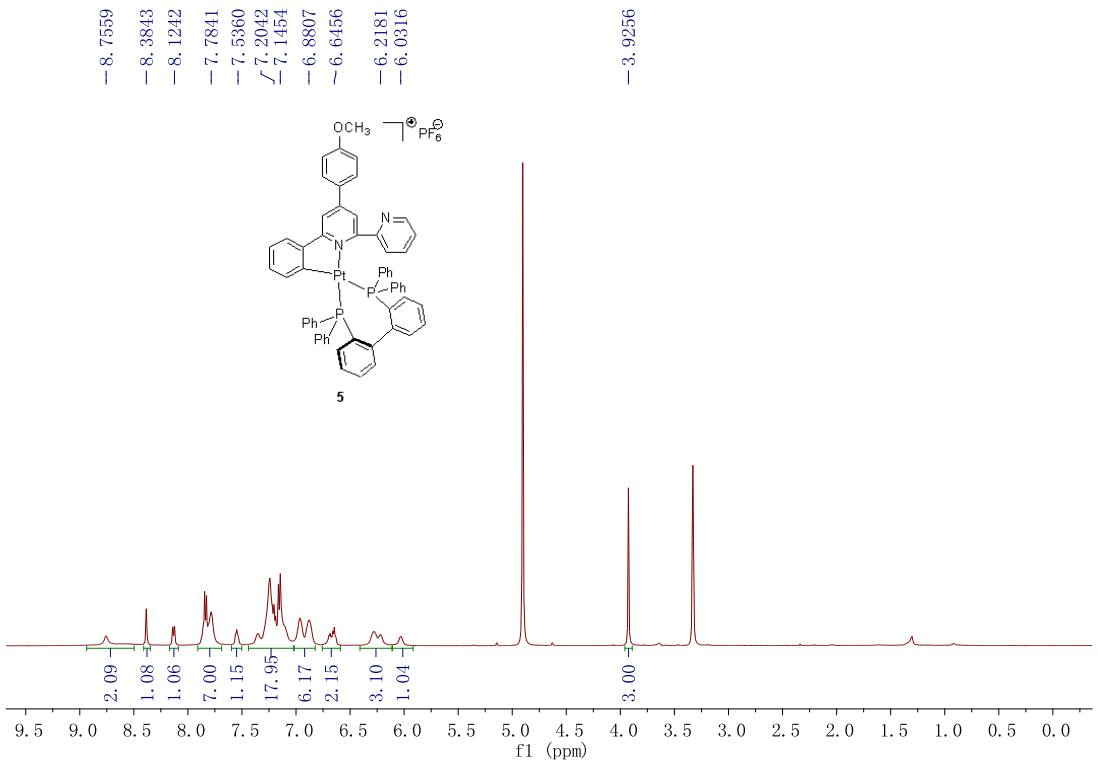
N
4
f1 (ppm)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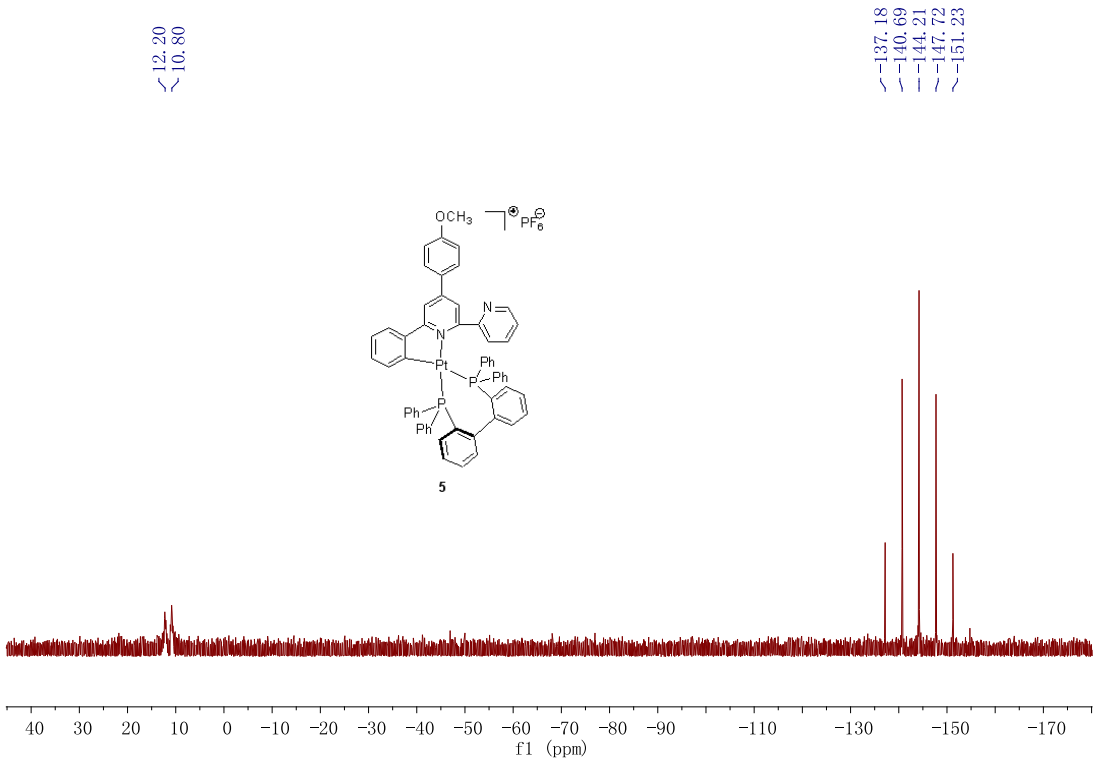
3.9256
OCH3
PF6
N
Pt
P
Ph
5
2.09
1.08
1.06
7.00
1.15
17.95
6.17
2.15
3.10
1.04
3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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OCH3
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Pt
P
Ph
5
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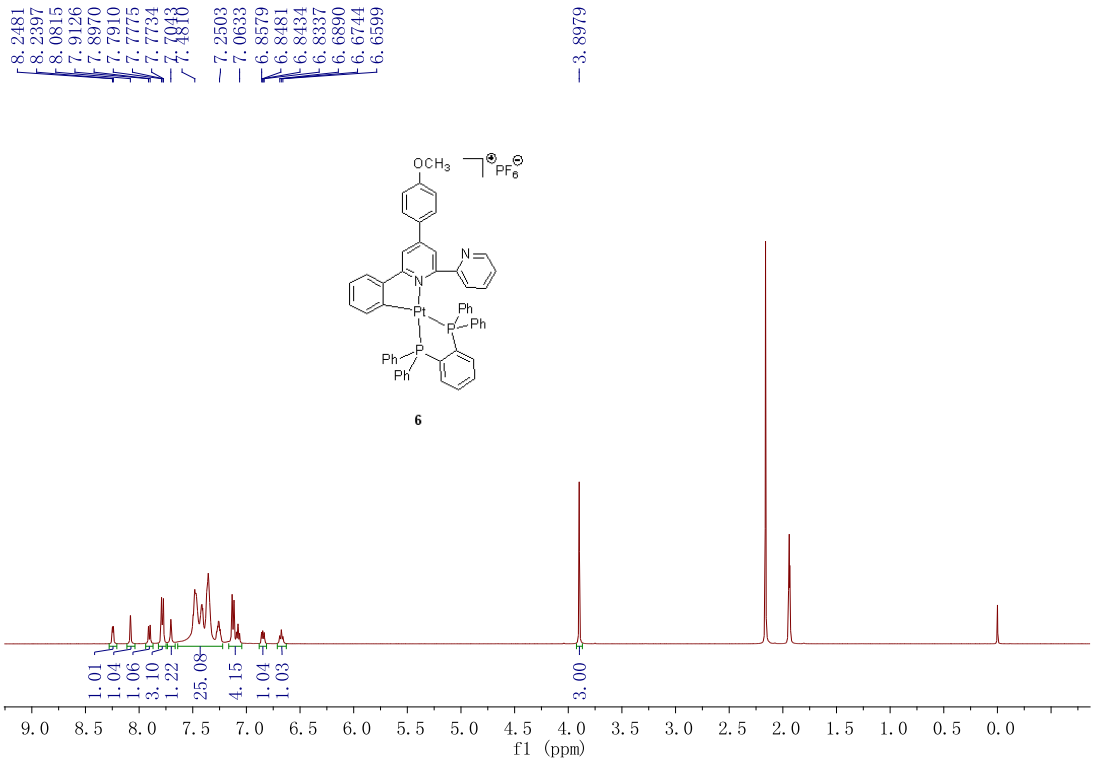
f1 (ppm)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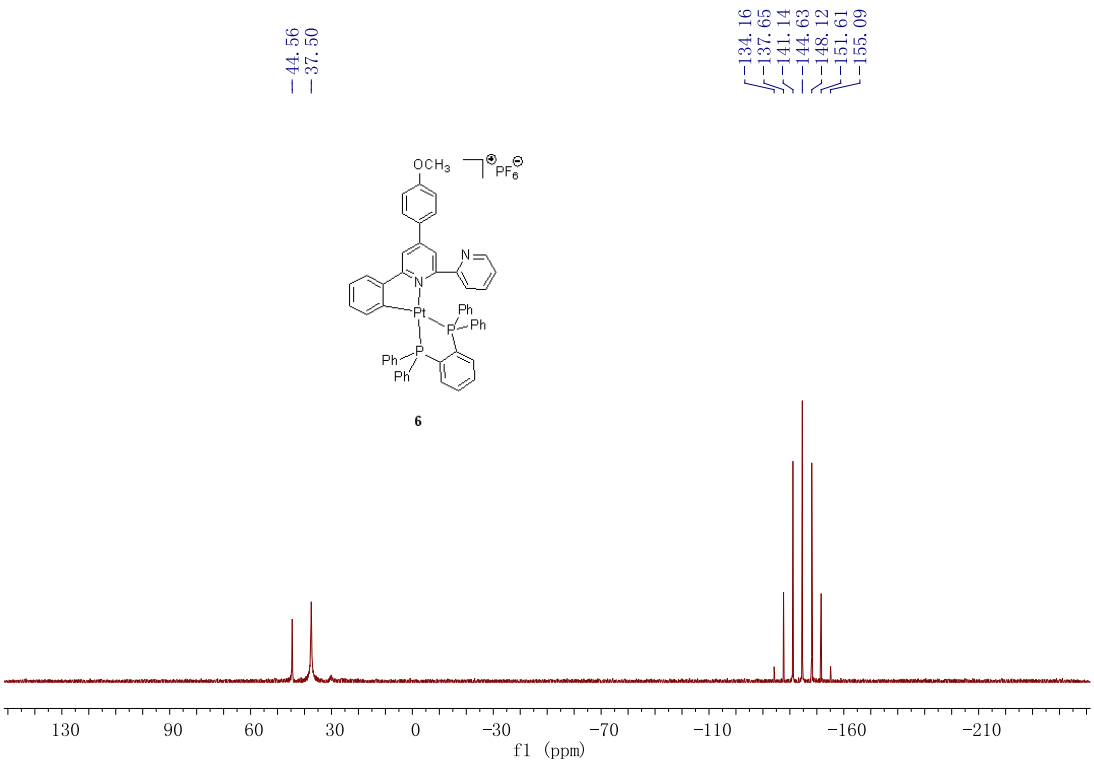
8.0815
7.9126
7.8970
7.7910
7.7775
7.7734
7.7043
7.4810
7.2503
7.0633
6.8579
6.8481
6.8434
6.8337
6.6890
6.6744
6.6599
3.8979
OCH3
PF6
N
Pt
P
Ph
6
1.01
1.04
1.06
3.10
1.22
25.08
4.15
1.04
1.03
3.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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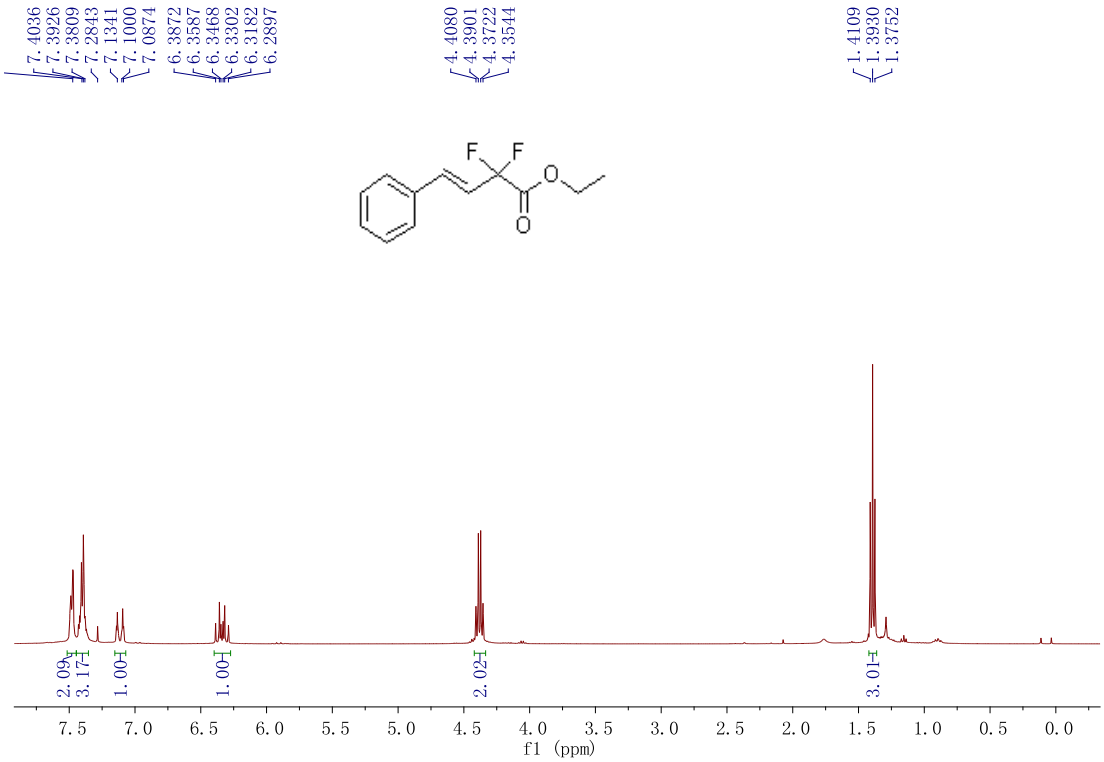
37.50
134.16
137.65
141.14
144.63
148.12
151.61
155.09
OCH3
PF6
N
Pt
P
Ph
6
130 90 60 30 0 -30 -70 -110 -160 -210
f1 (ppm)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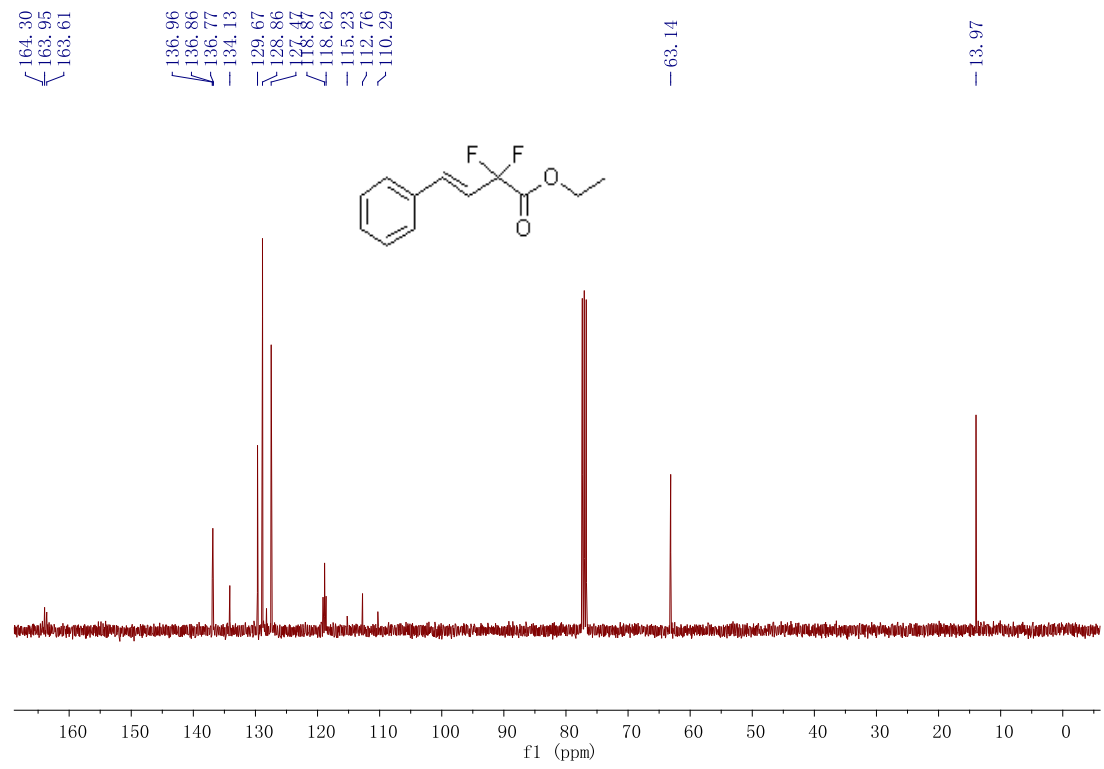
7.3809
7.2843
7.1341
7.1000
7.0874
6.3872
6.3587
6.3468
6.3302
6.3182
6.2897
4.4080
4.3901
4.3722
4.3544
1.4109
1.3930
1.3752
F
F
O
O
2.09
3.17
1.00
1.00
2.02
3.01
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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163.95
163.61
136.96
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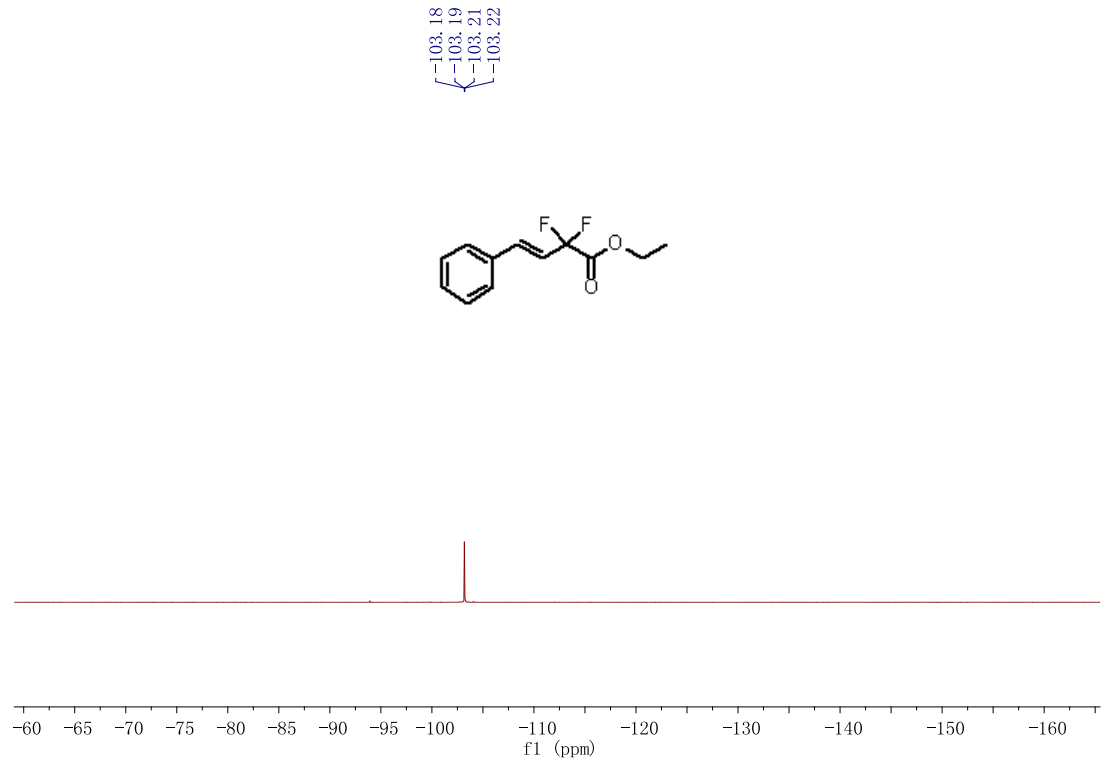
136.77
134.13
129.67
128.86
127.47
118.62
115.23
112.76
110.29
63.14
13.97
F
F
O
O
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-103.18
-103.19
-103.21
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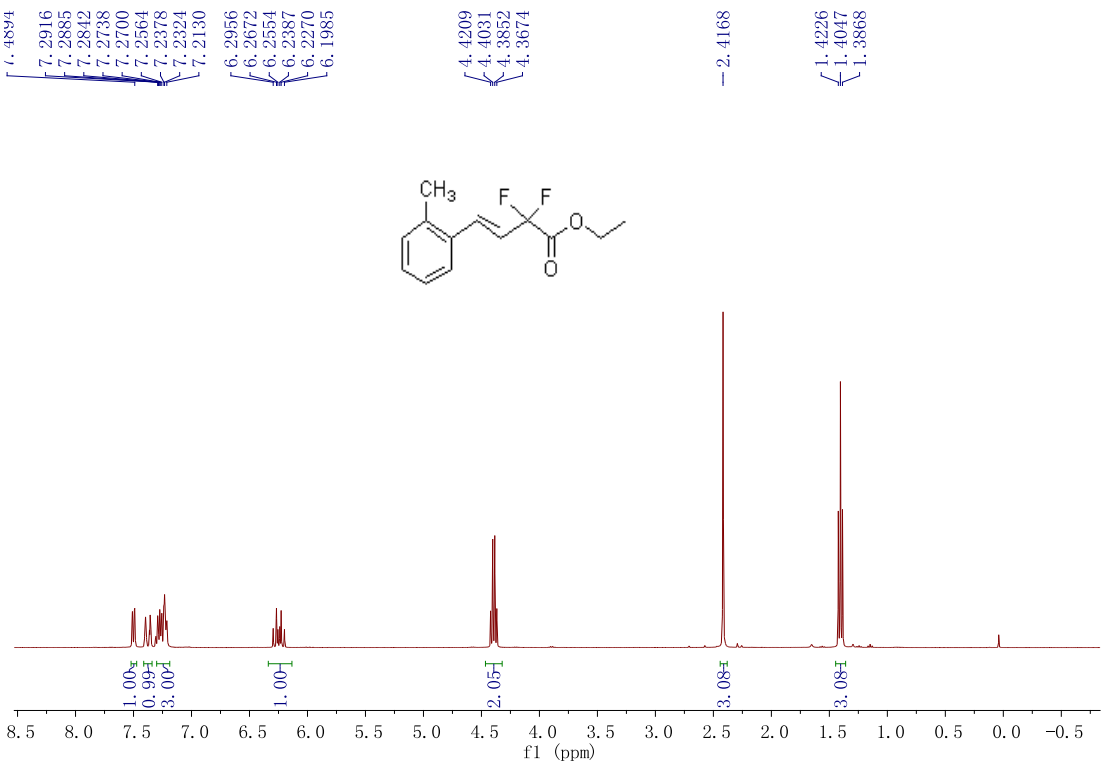
F
F
O
O
-60 -65 -70 -75 -80 -85 -90 -95 -100 -110 -120 -130 -140 -150 -160
f1 (ppm)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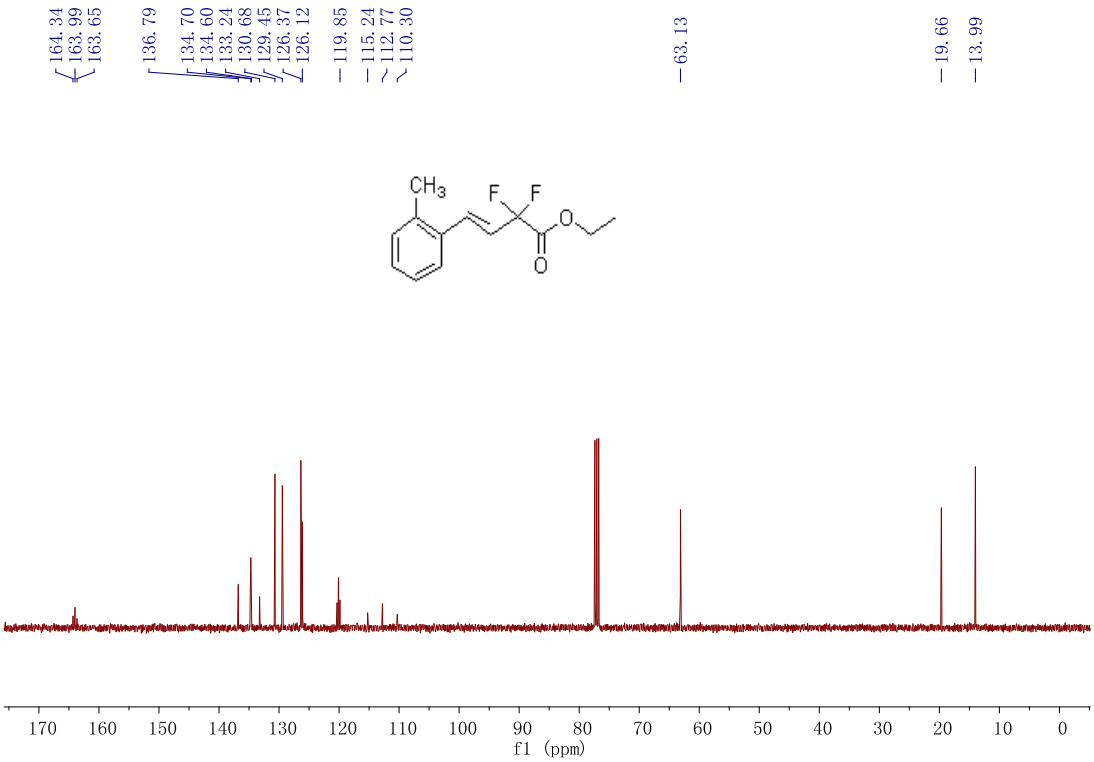
7.2885
7.2842
7.2738
7.2700
7.2564
7.2378
7.2324
7.2130
6.2956
6.2672
6.2554
6.2387
6.2270
6.1985
4.4209
4.4031
4.3852
4.3674
2.4168
1.4226
1.4047
1.3868
CH3
F
F
O
O
1.00
0.99
3.00
1.00
2.05
3.08
3.08
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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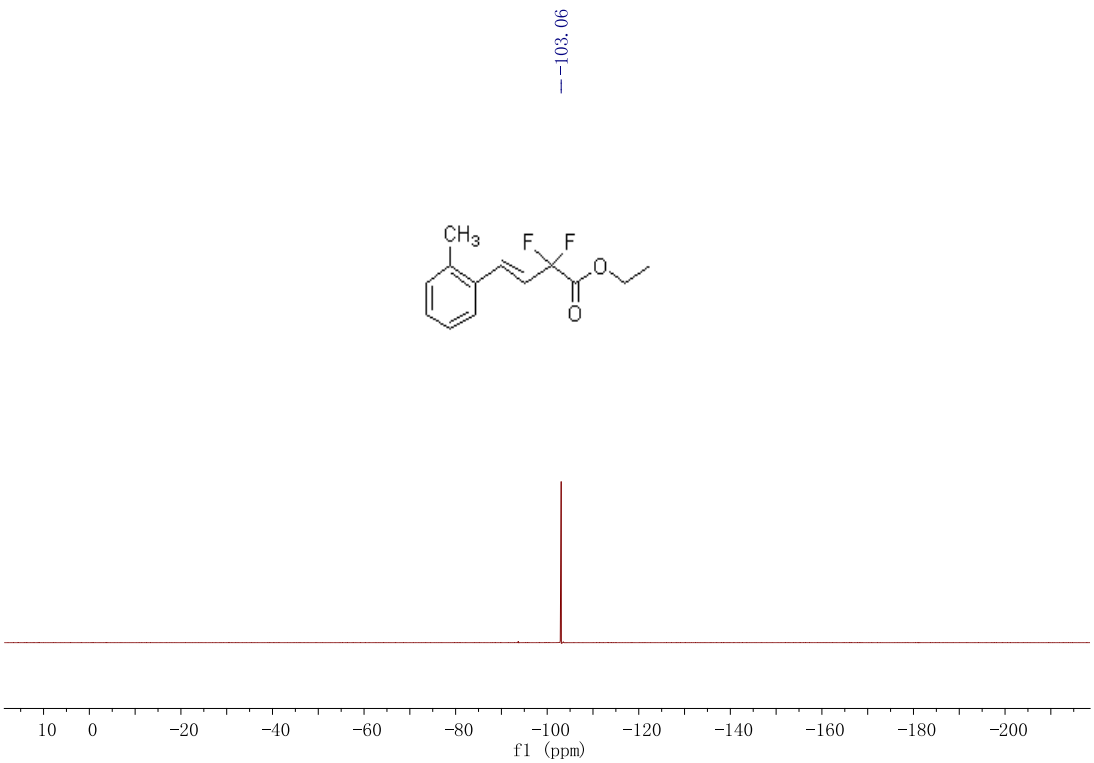
133.24
130.68
129.45
126.37
126.12
119.85
115.24
112.77
110.30
63.13
19.66
13.99
CH3
F
F
O
O
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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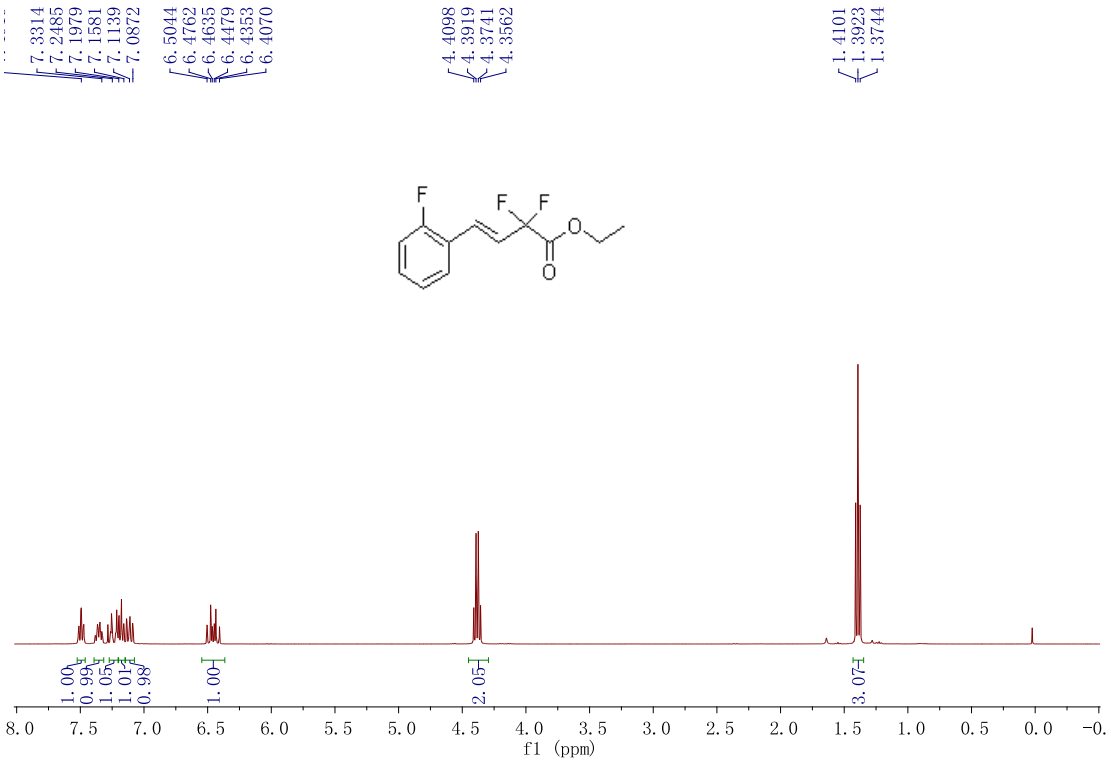
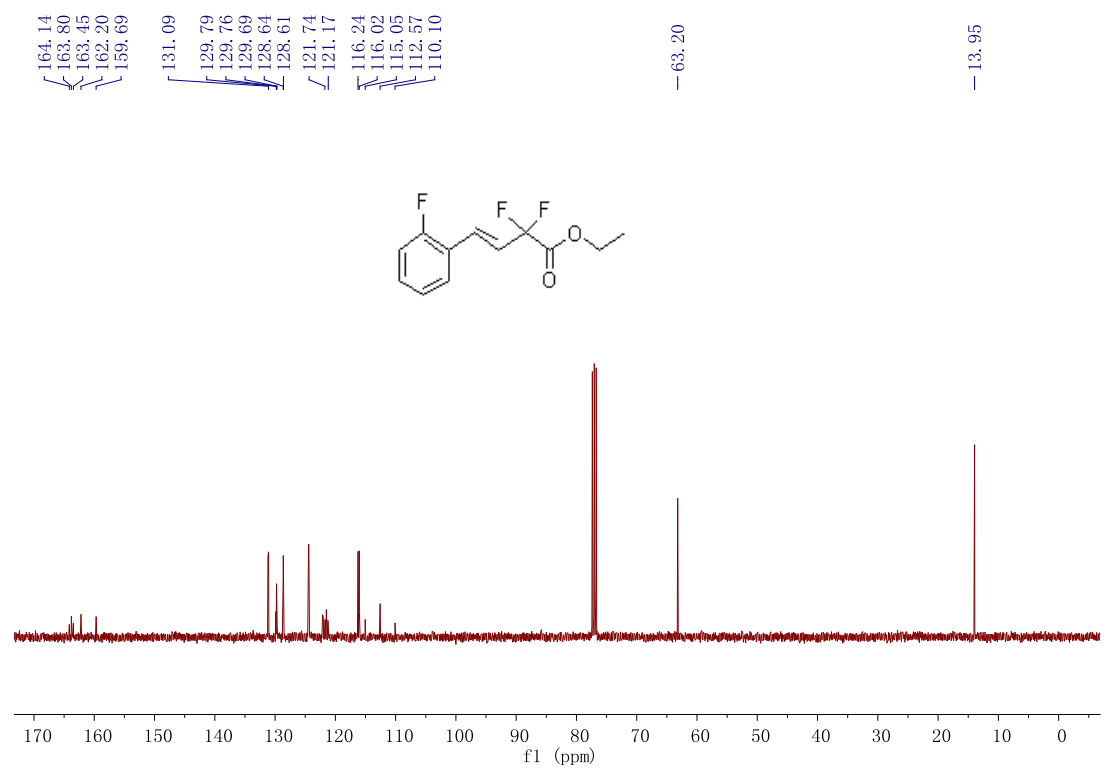
CH3
F
F
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)


7.3314
7.2485
7.1979
7.1581
7.1139
7.0872
6.5044
6.4762
6.4635
6.4479
6.4353
6.4070
4.4098
4.3919
4.3741
4.3562
1.4101
1.3923
1.3744
F
F
F
O
O
1.00
0.99
1.05
1.01
0.98
1.00
2.05
3.07
f1 (ppm)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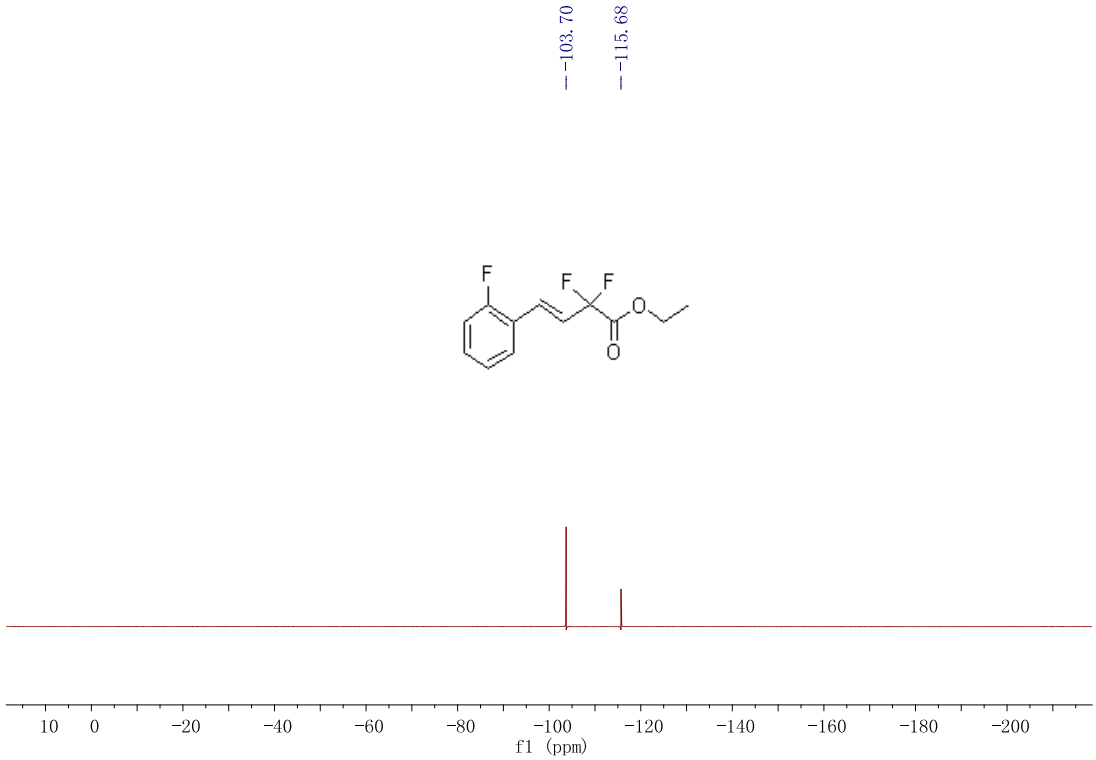
163.80
163.45
162.20
159.69
131.09
129.79
129.76
129.69
128.64
128.61
121.74
121.17
116.24
116.02
115.05
112.57
110.10
63.20
13.95
F
F
F
O
O
f1 (ppm)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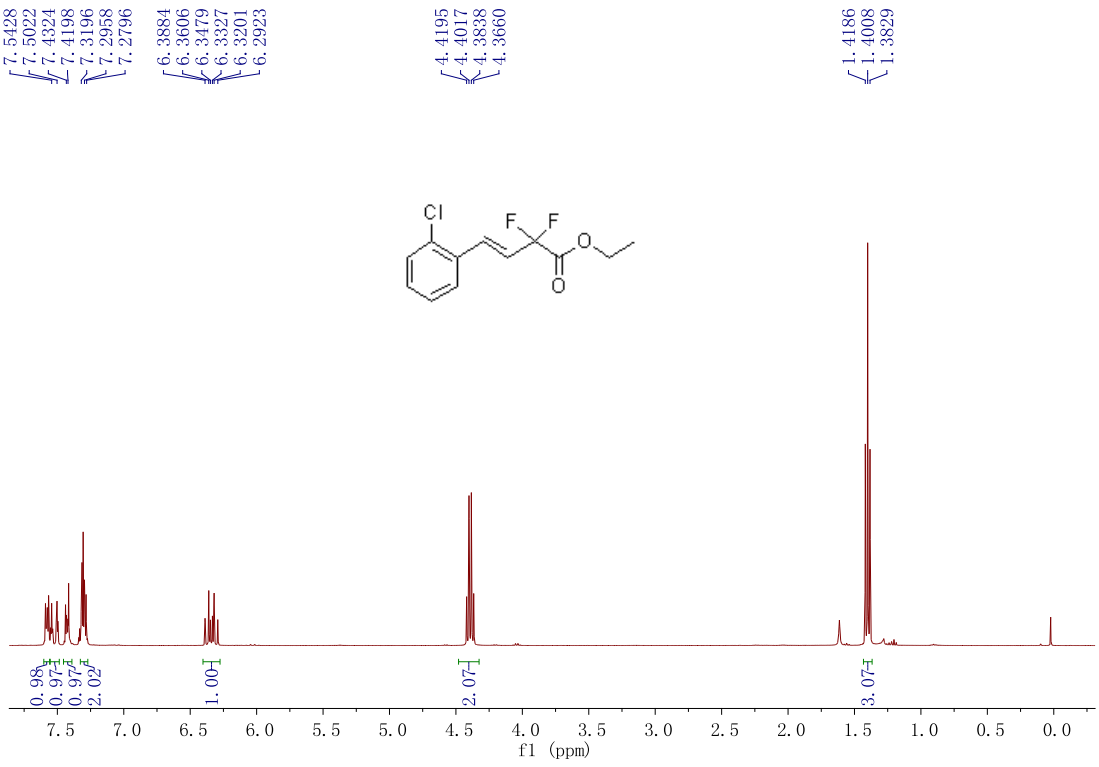
-115.68
F
F
F
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.5022
7.4324
7.4198
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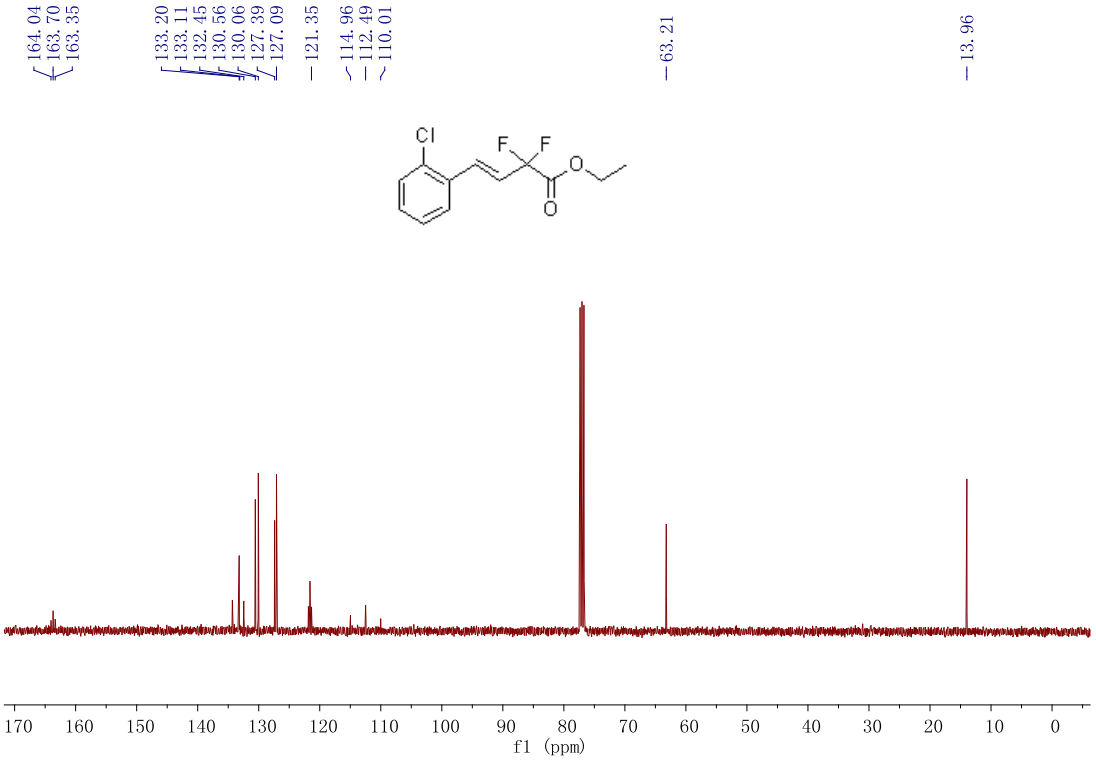
7.2958
7.2796
6.3884
6.3606
6.3479
6.3327
6.3201
6.2923
4.4195
4.4017
4.3838
4.3660
1.4186
1.4008
1.3829
Cl
F
F
O
O
0.98
0.97
0.97
2.02
1.00
2.07
3.07
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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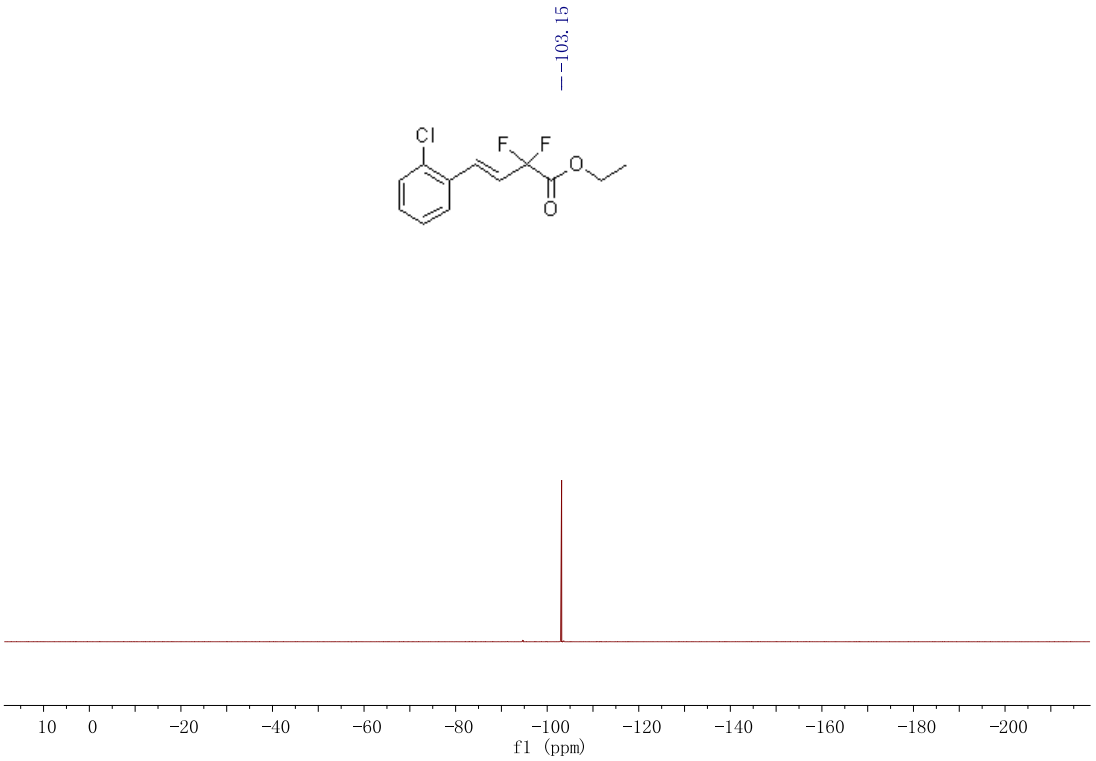
163.70
163.35
133.20
133.11
132.45
130.56
130.06
127.39
127.09
121.35
114.96
112.49
110.01
63.21
13.96
Cl
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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Cl
F
F
O
O
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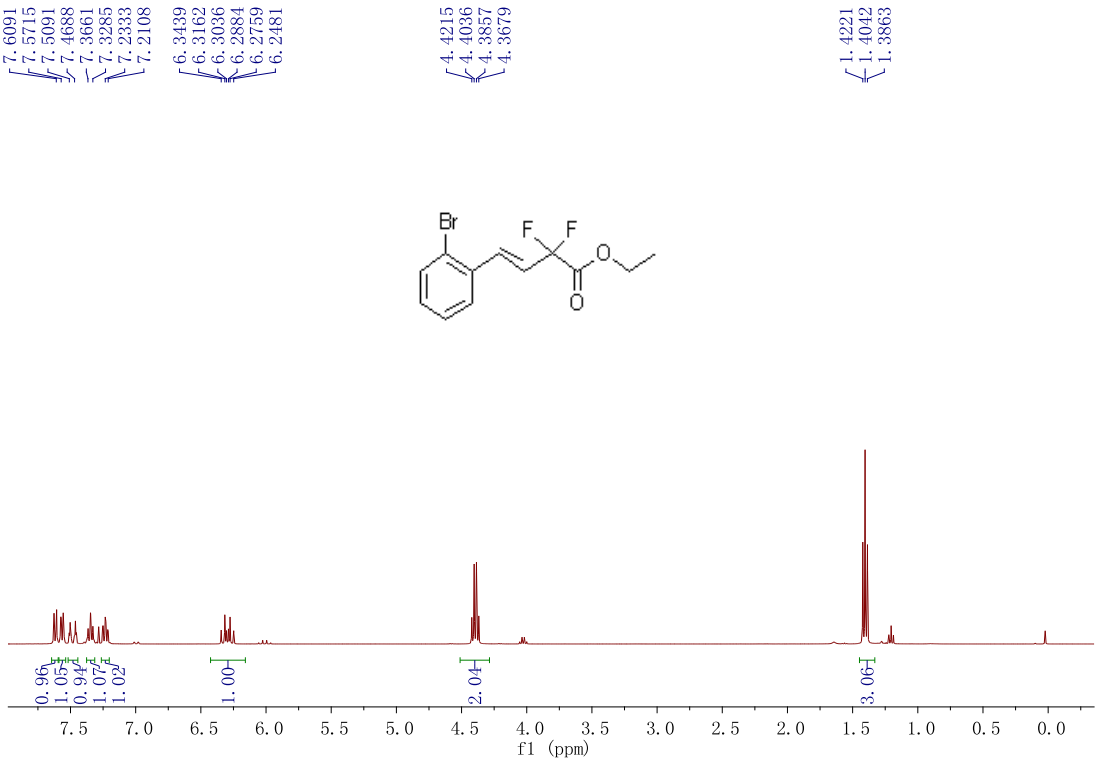
f1 (ppm)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7.5091
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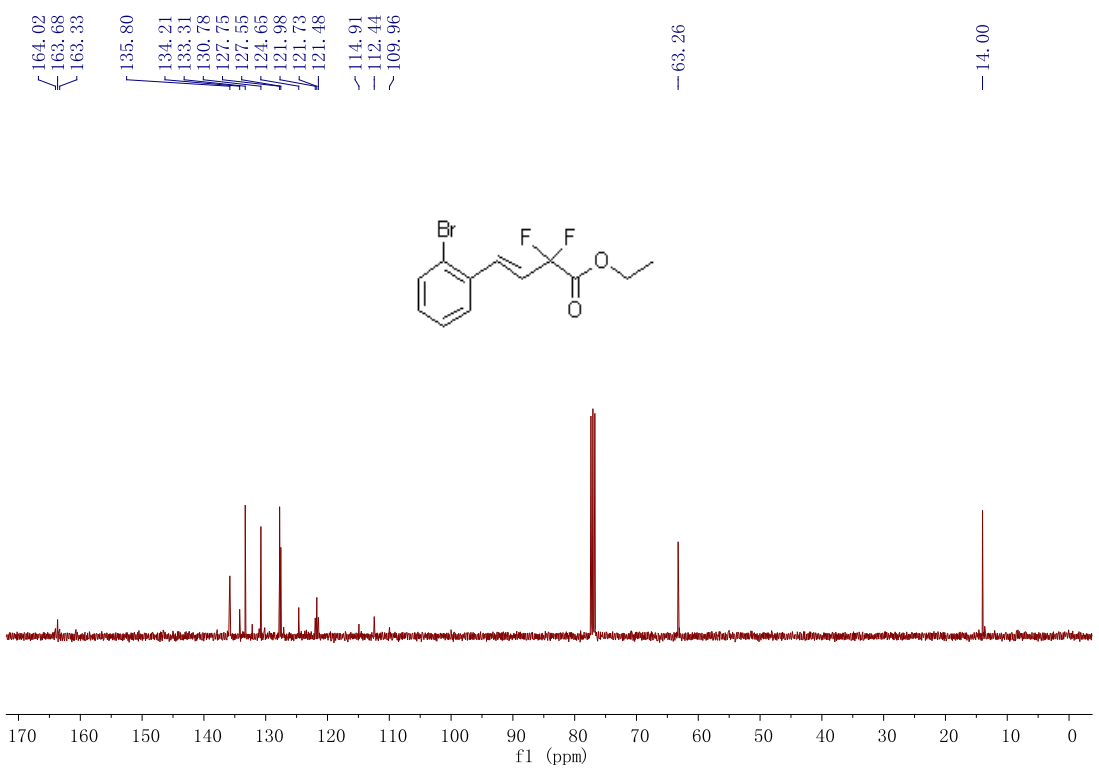
7.3661
7.3285
7.2333
7.2108
6.3439
6.3162
6.3036
6.2884
6.2759
6.2481
4.4215
4.4036
4.3857
4.3679
1.4221
1.4042
1.3863
Br
F
F
O
O
0.96
1.05
0.94
1.07
1.02
1.00
2.04
3.06
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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163.33
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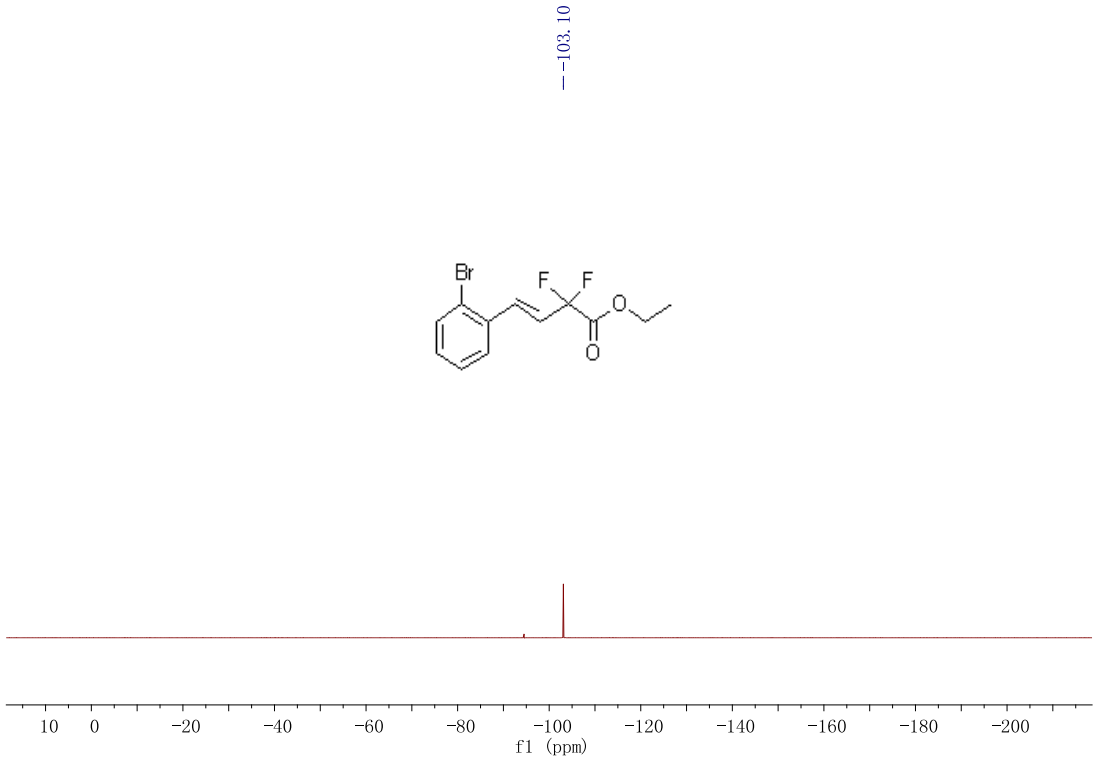
134.21
133.31
130.78
127.75
127.55
124.65
121.98
121.73
121.48
114.91
112.44
109.96
63.26
14.00
Br
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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Br
F
F
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
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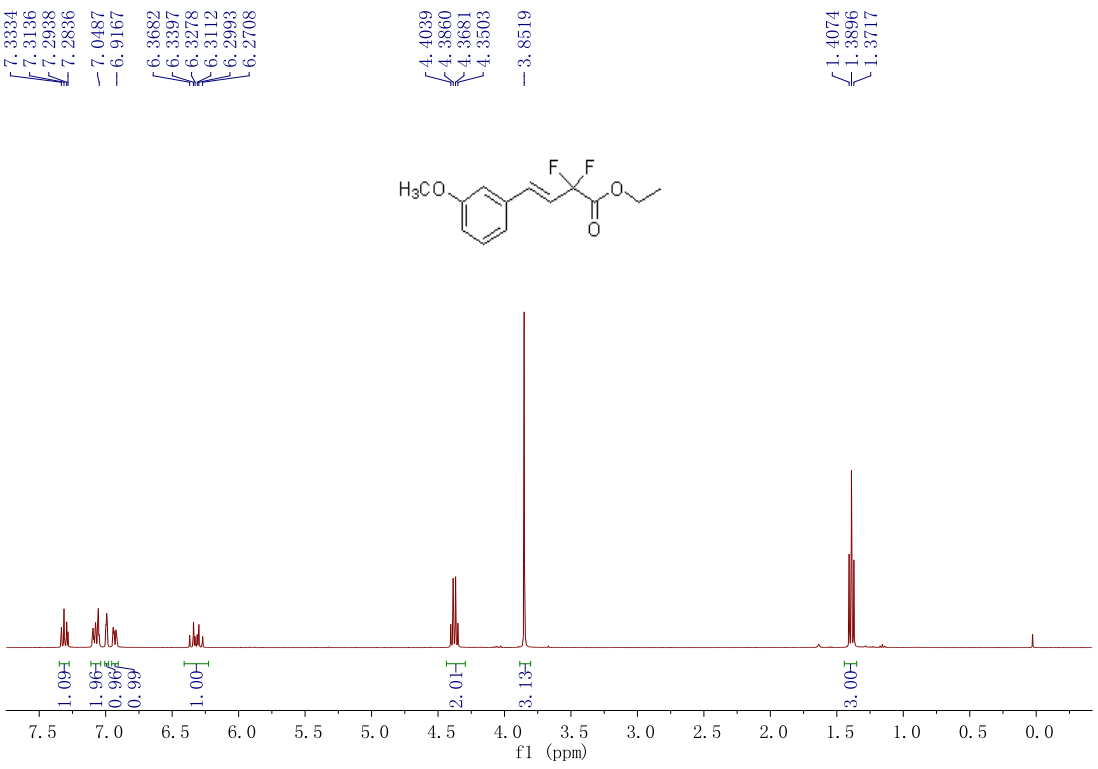
-180
-200
f1 (ppm)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6.3397
6.3278
6.3112
6.2993
6.2708
4.4039
4.3860
4.3681
4.3503
3.8519
1.4074
1.3896
1.3717
H3CO
F
F
O
O
1.09
1.96
0.96
0.99
1.00
2.01
3.13
3.00
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
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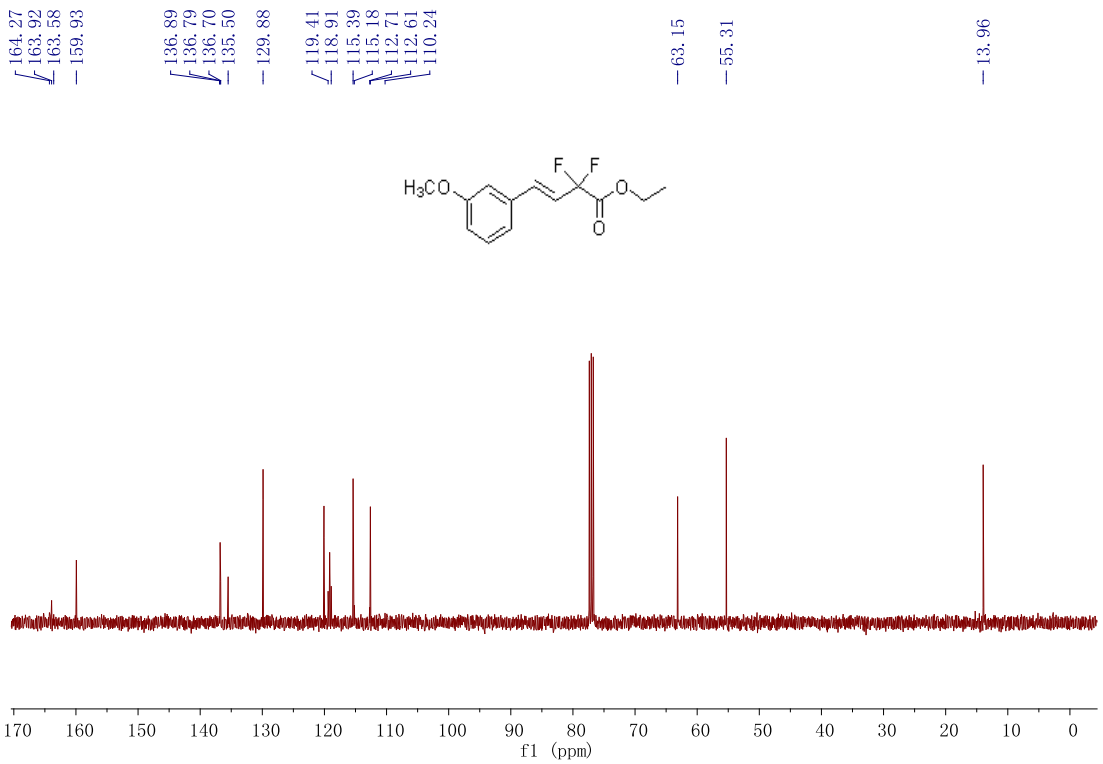
0.0
f1 (ppm)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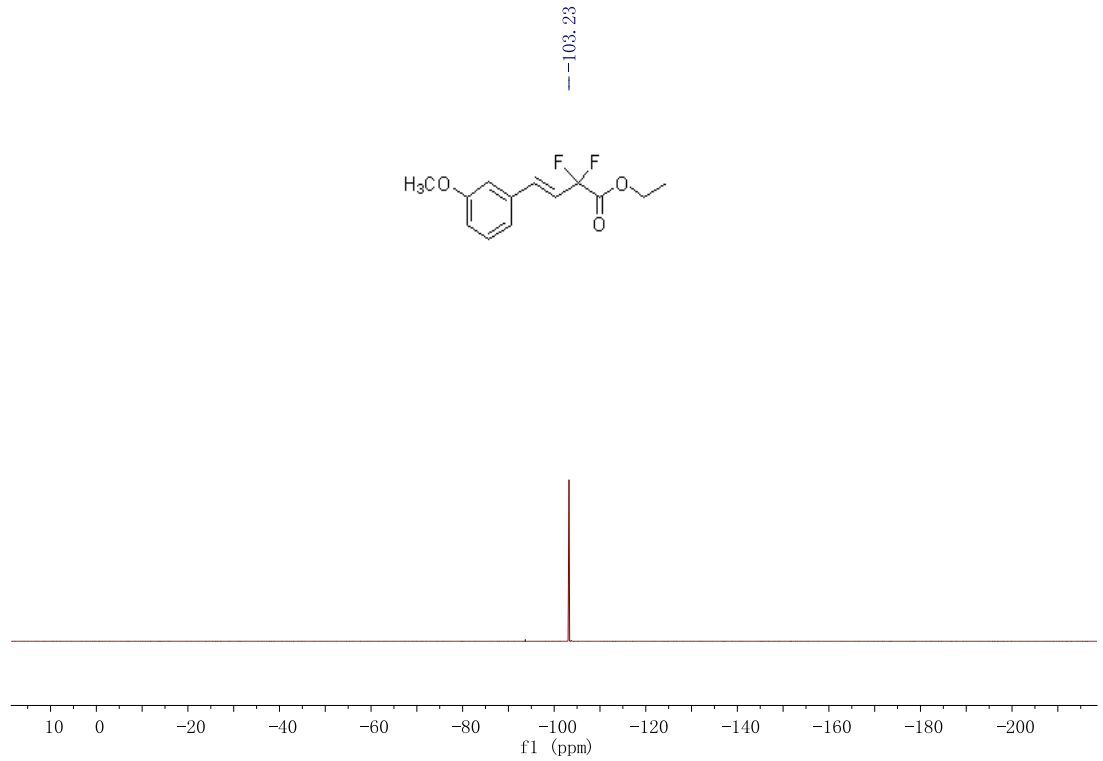
135.50
129.88
119.41
118.91
115.39
115.18
112.71
112.61
110.24
63.15
55.31
13.96
F
F
H3CO
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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F
H3CO
O
O
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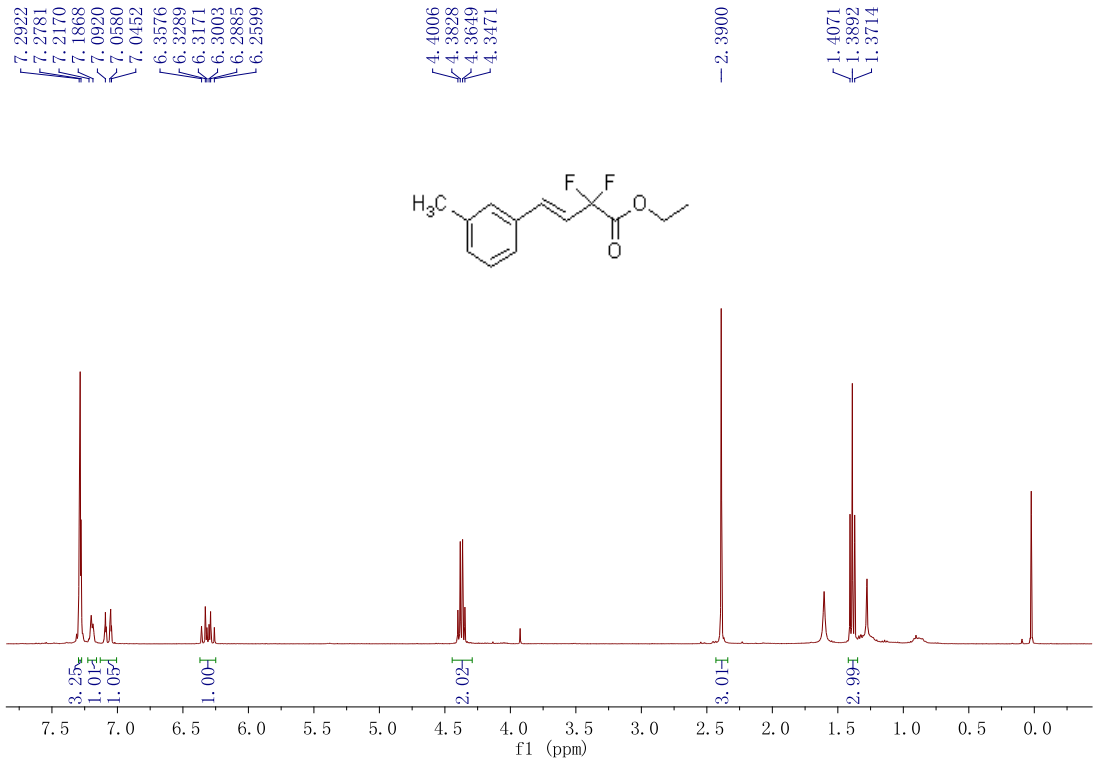
f1 (ppm)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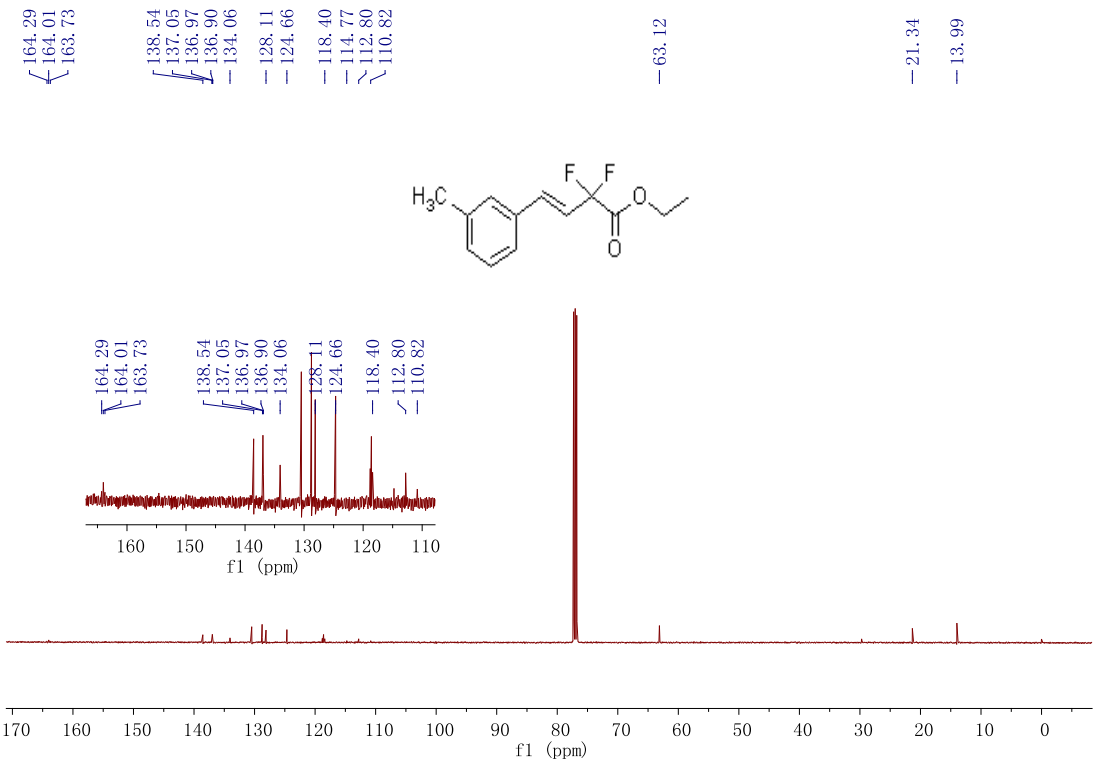
6.3289
6.3171
6.3003
6.2885
6.2599
4.4006
4.3828
4.3649
4.3471
2.3900
1.4071
1.3892
1.3714
F
F
H3C
O
O
3.25
1.01
1.05
1.00
2.02
3.01
2.99
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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136.97
136.90
134.06
128.11
124.66
118.40
114.77
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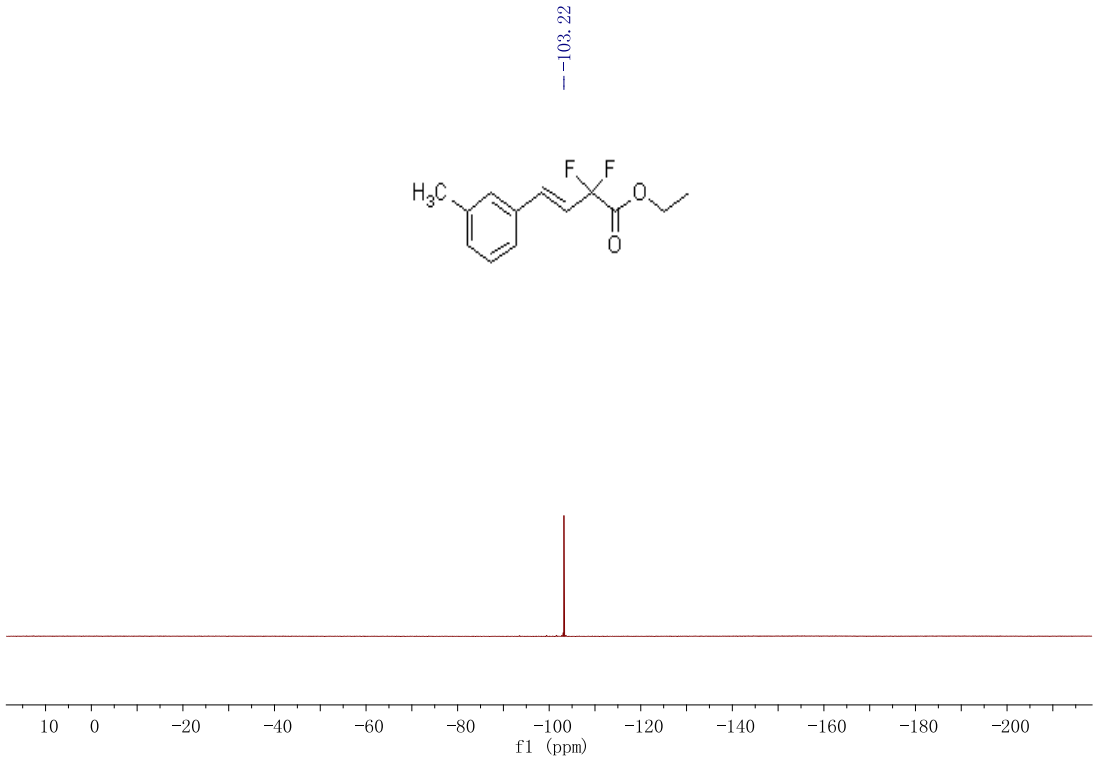
110.82
63.12
21.34
13.99
F
F
H3C
O
O
160 150 140 130 120 110
f1 (ppm)
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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F
F
H3C
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O
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0
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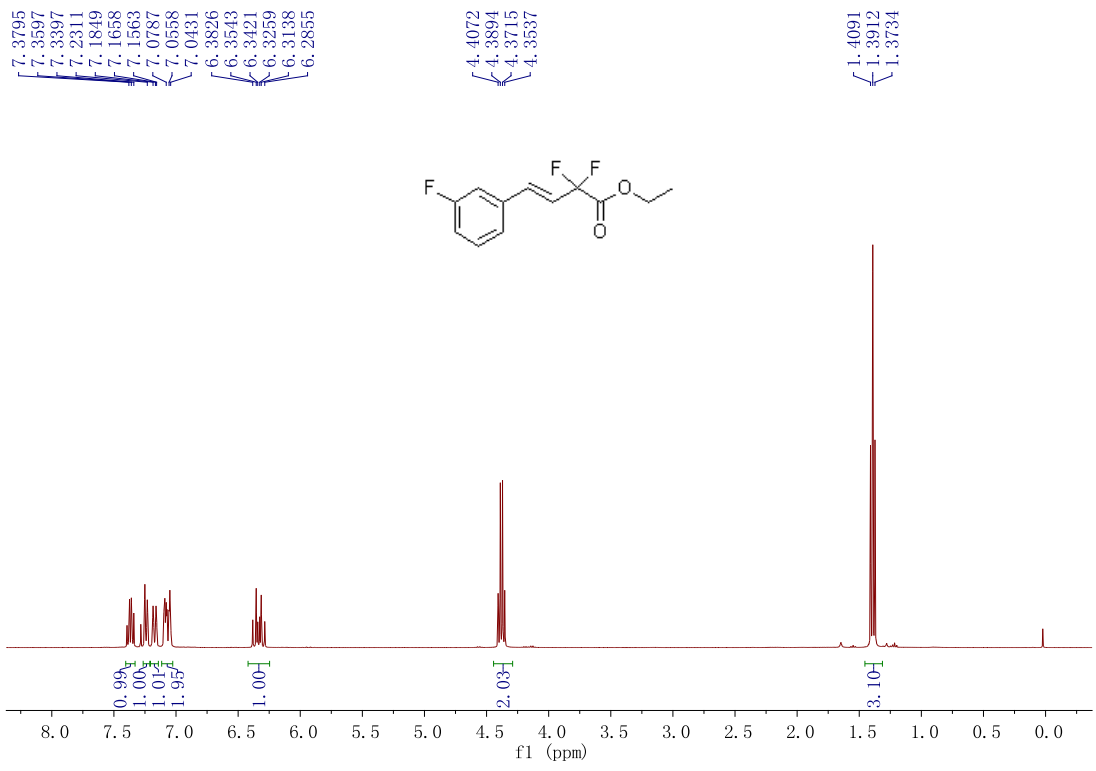
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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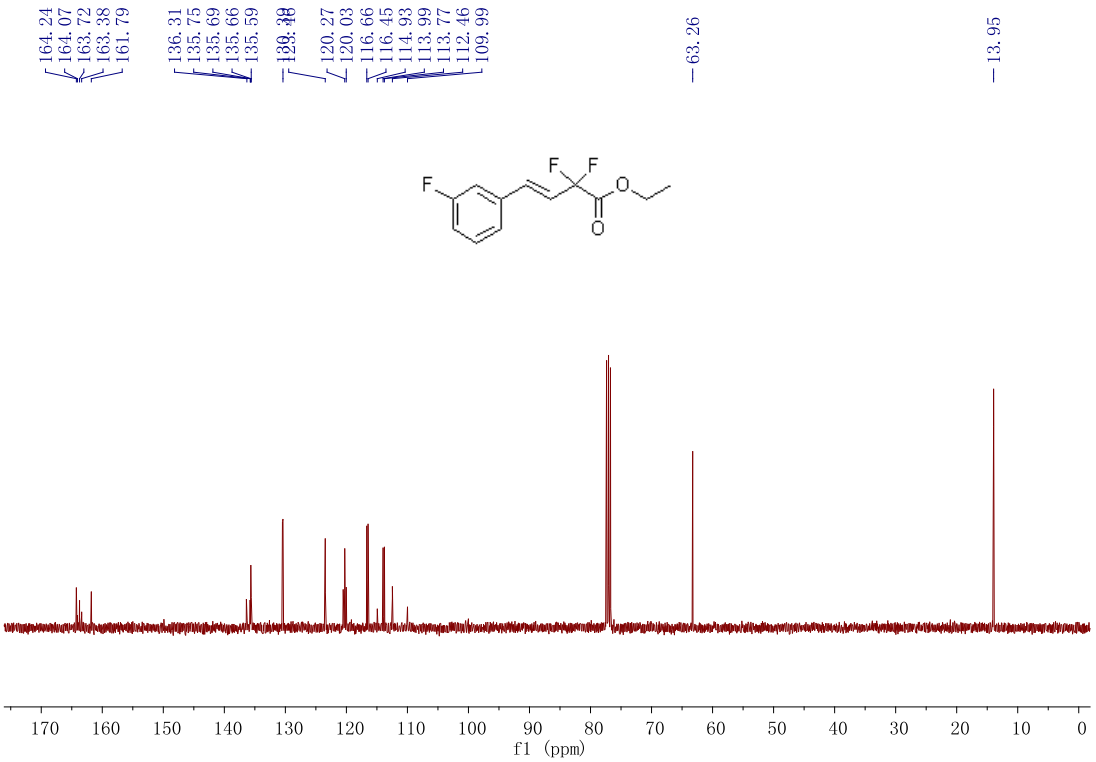
6.3543
6.3421
6.3259
6.3138
6.2855
4.4072
4.3894
4.3715
4.3537
1.4091
1.3912
1.3734
F
F
F
O
O
0.99
1.00
1.01
1.95
1.00
2.03
3.10
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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120.03
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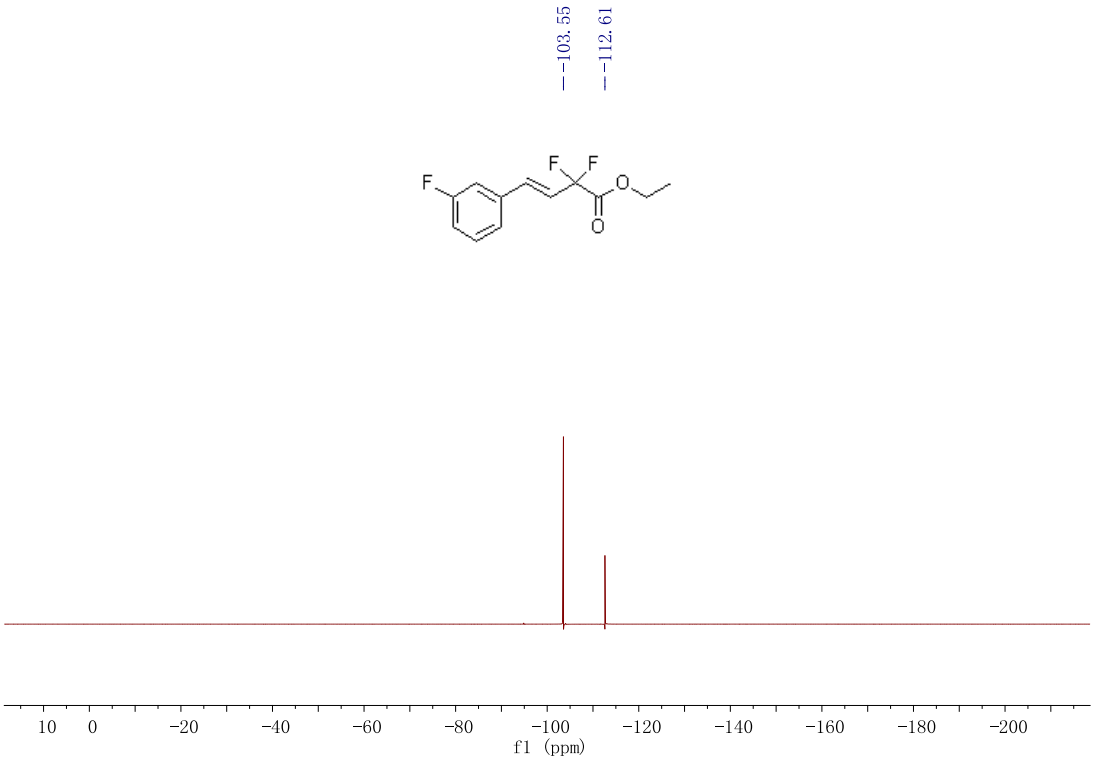
116.45
114.93
113.99
113.77
112.46
109.99
63.26
13.95
F
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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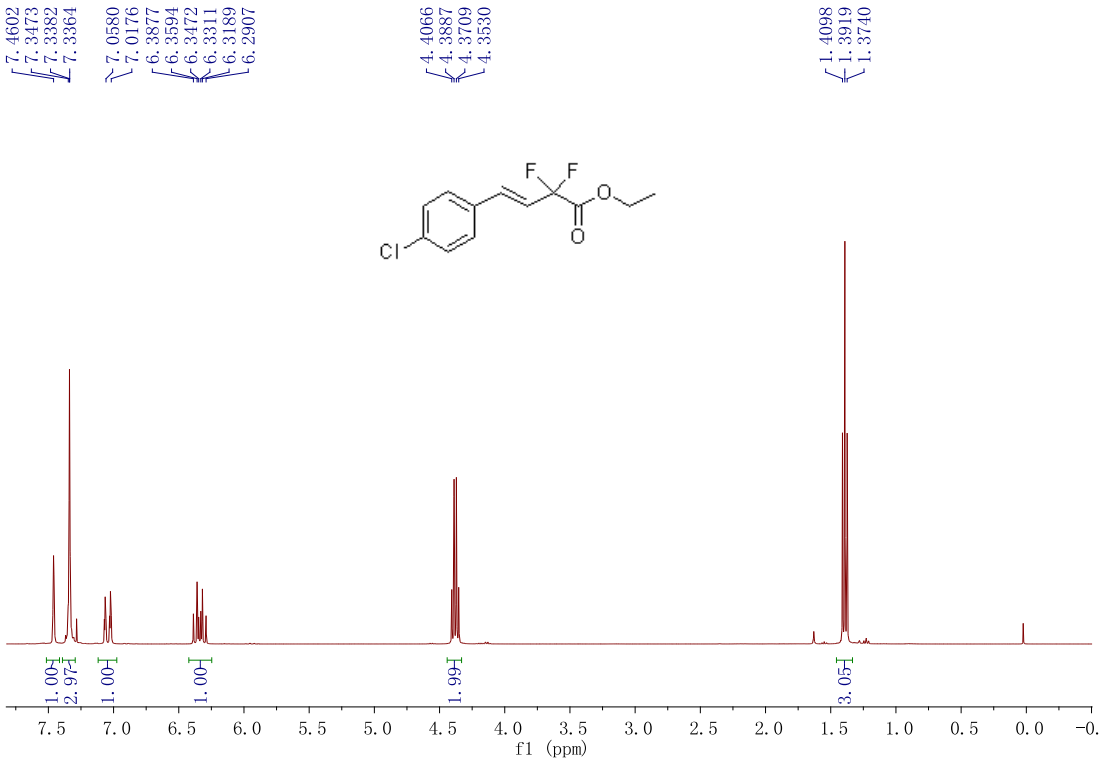
-112.61
F
F
F
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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6.3472
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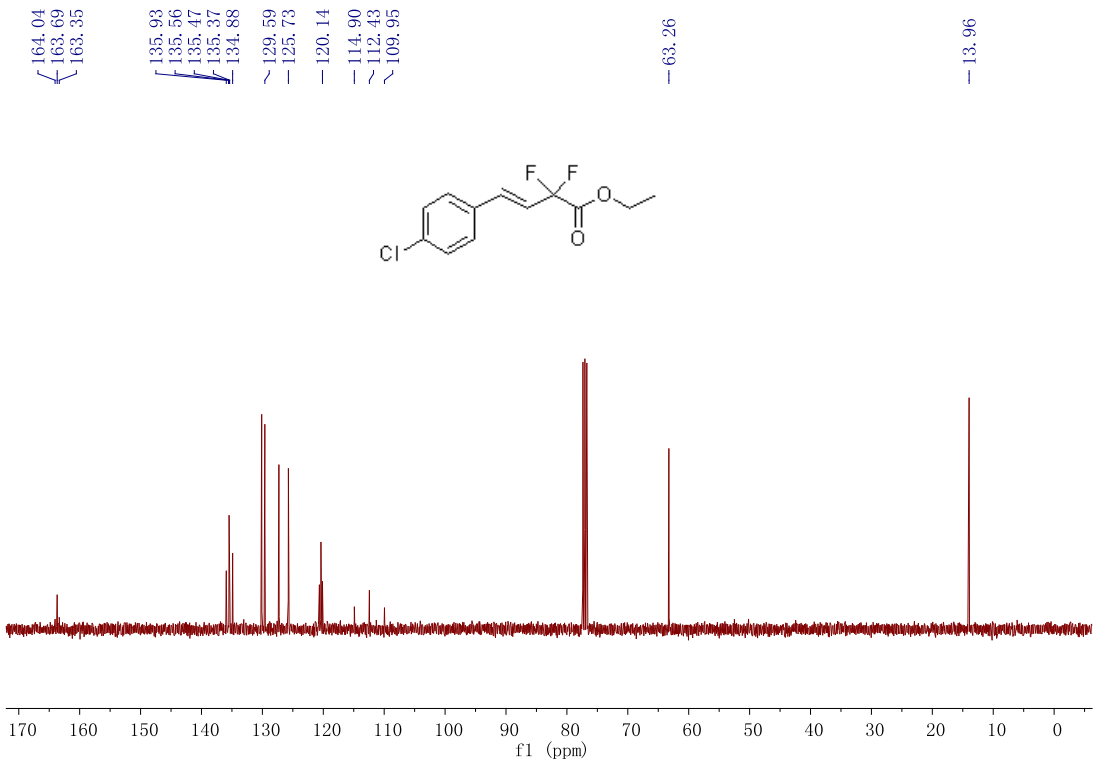
6.3189
6.2907
4.4066
4.3887
4.3709
4.3530
1.4098
1.3919
1.3740
F
F
O
O
Cl
1.00
2.97
1.00
1.00
1.99
3.05
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)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134.88
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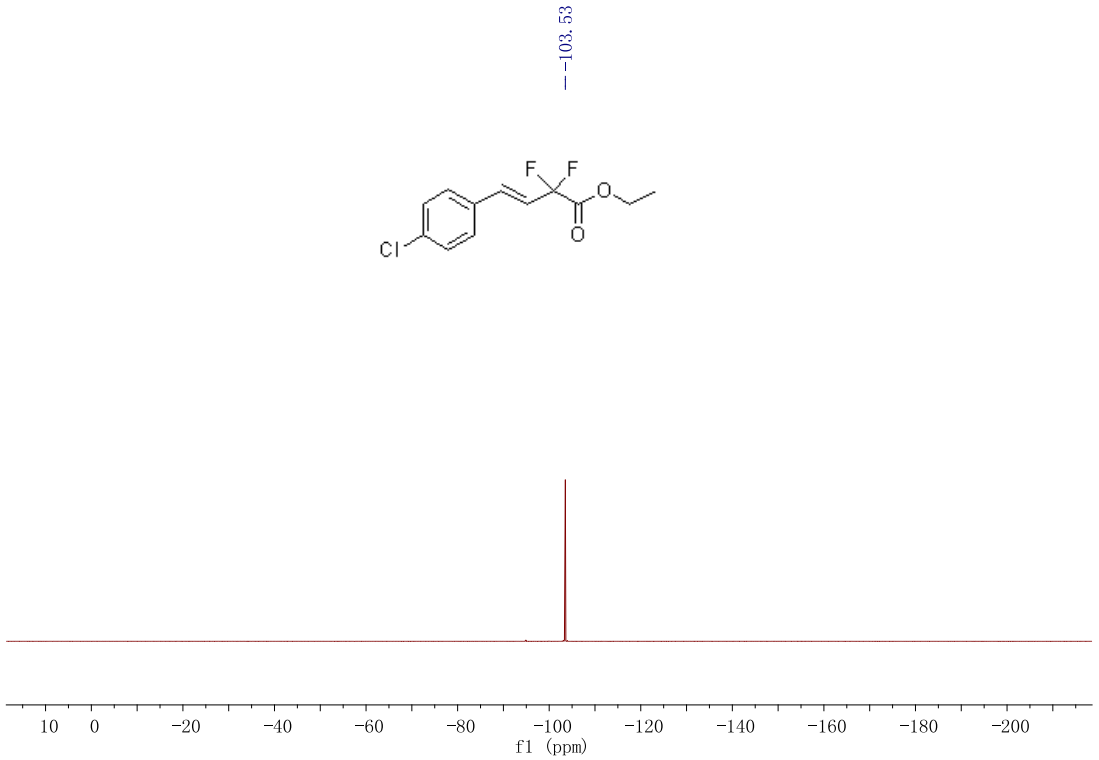
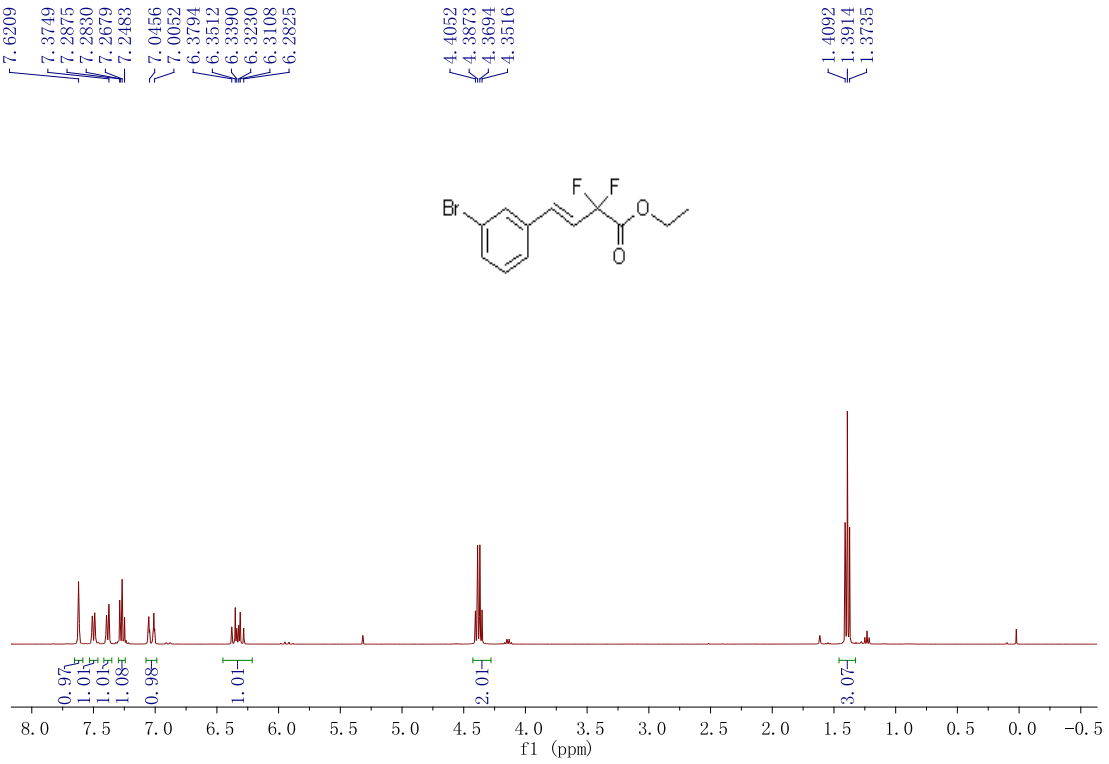
125.73
120.14
114.90
112.43
109.95
63.26
13.96
F
F
O
O
Cl
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-103.53
F
F
O
O
Cl
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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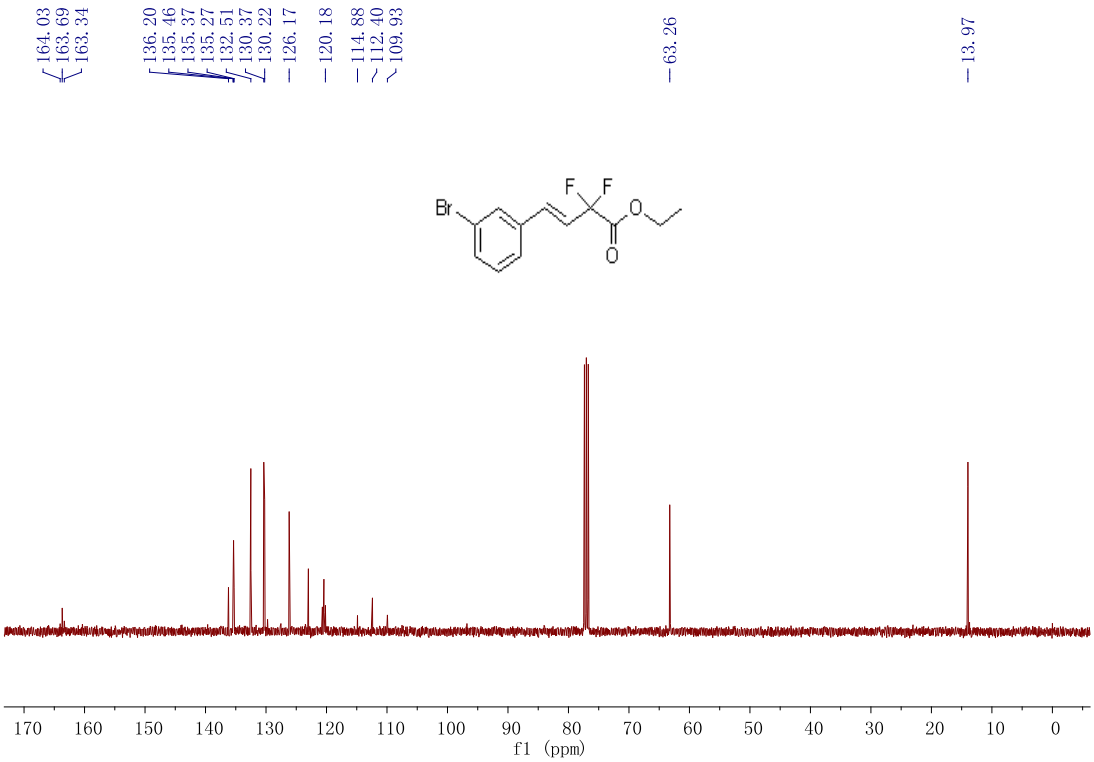
7.2830
7.2679
7.2483
7.0456
7.0052
6.3794
6.3512
6.3390
6.3230
6.3108
6.2825
4.4052
4.3873
4.3694
4.3516
1.4092
1.3914
1.3735
Br
F
F
O
O
0.97
1.01
1.01
1.08
0.98
1.01
2.01
3.07
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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163.34
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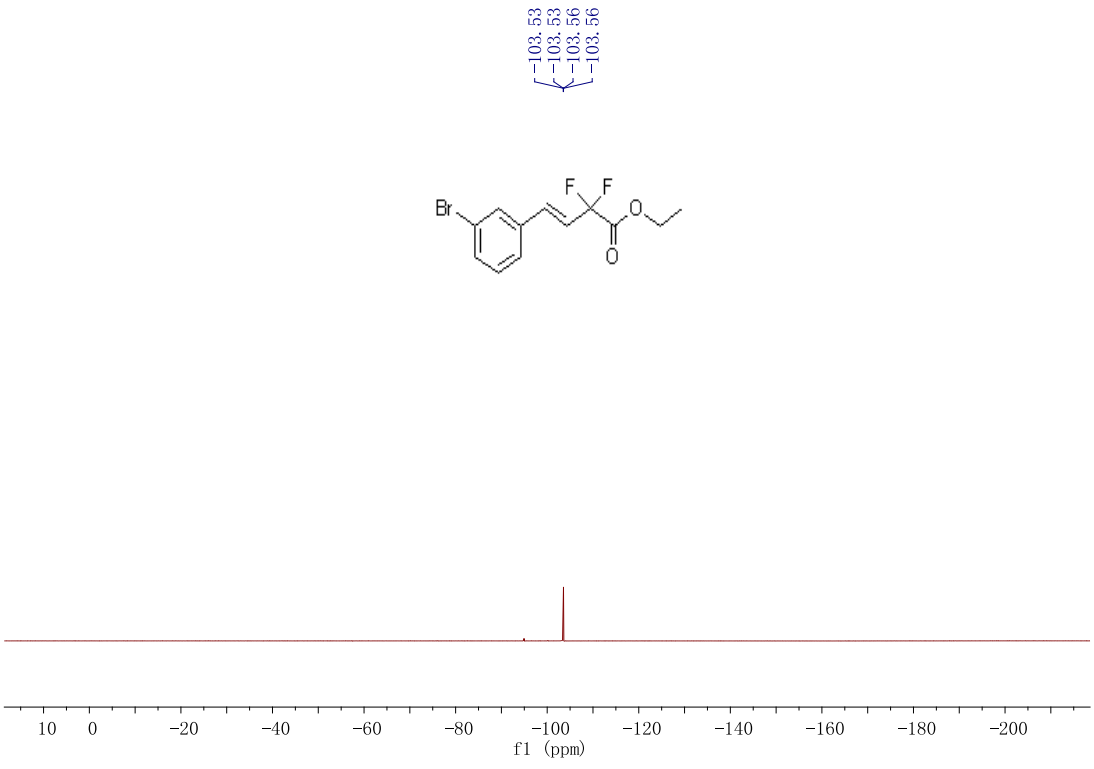
135.37
135.27
132.51
130.37
130.22
126.17
120.18
114.88
112.40
109.93
63.26
13.97
Br
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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O
O
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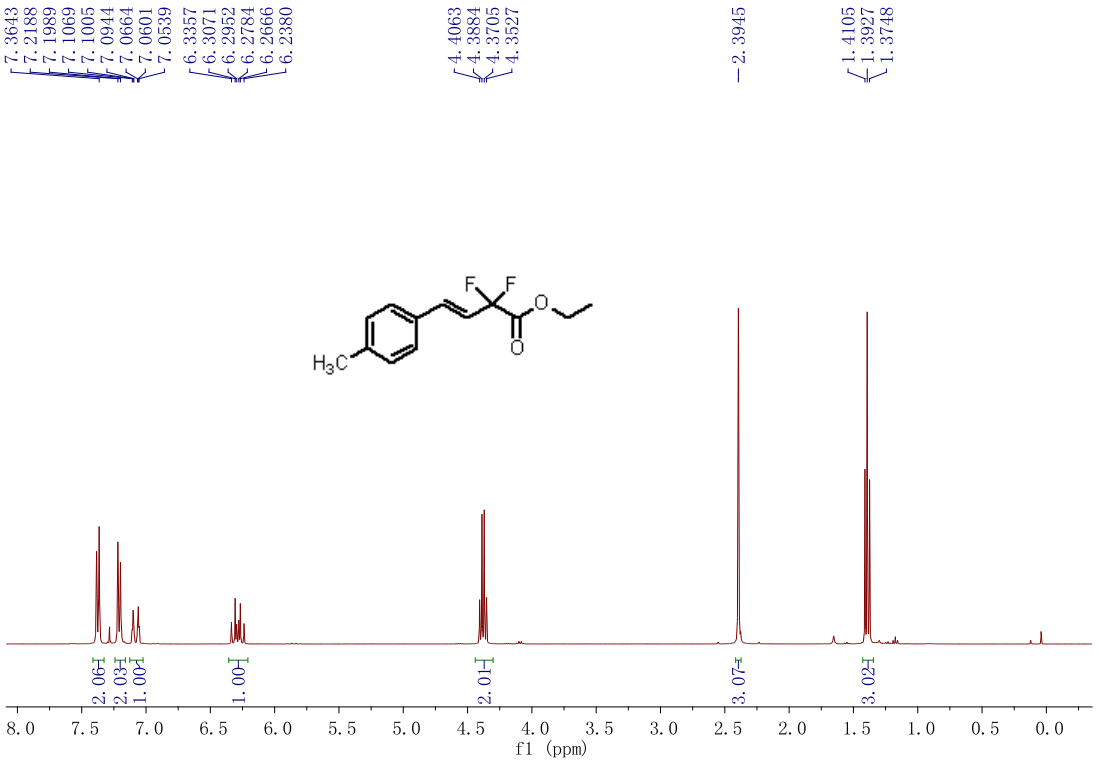
f1 (ppm)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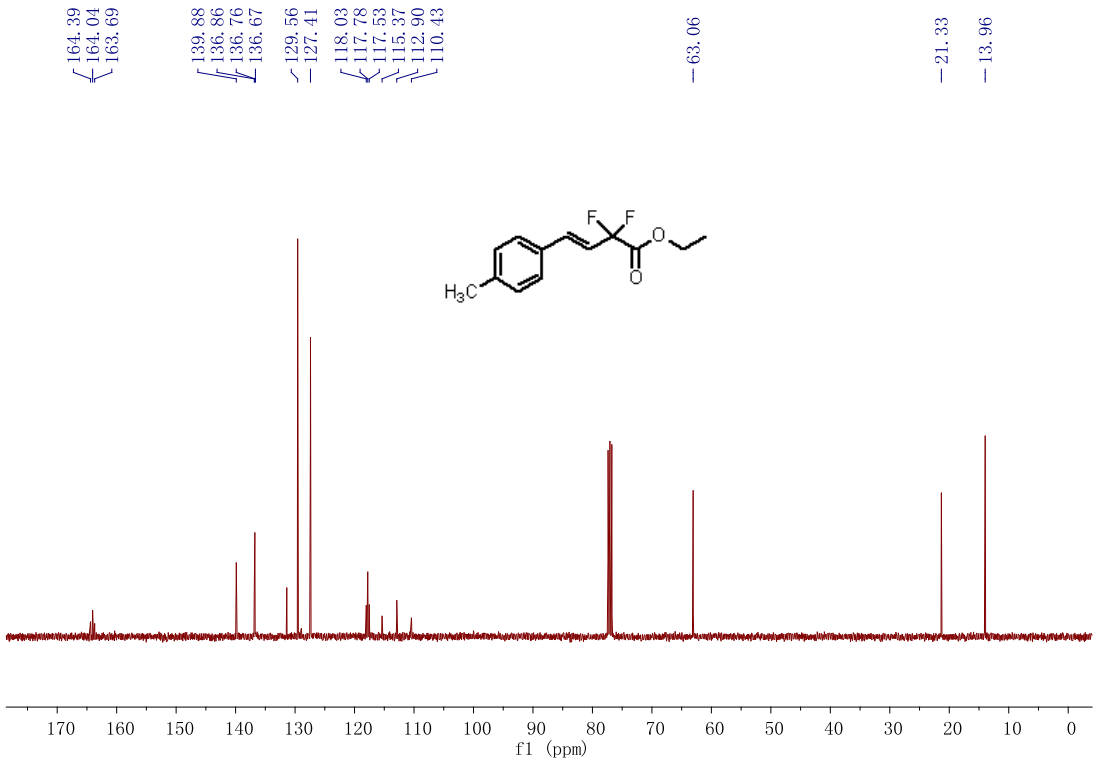
7.1005
7.0944
7.0664
7.0601
7.0539
6.3357
6.3071
6.2952
6.2784
6.2666
6.2380
4.4063
4.3884
4.3705
4.3527
2.3945
1.4105
1.3927
1.3748
F
F
O
O
H3C
2.06
2.03
1.00
1.00
2.01
3.07
3.02
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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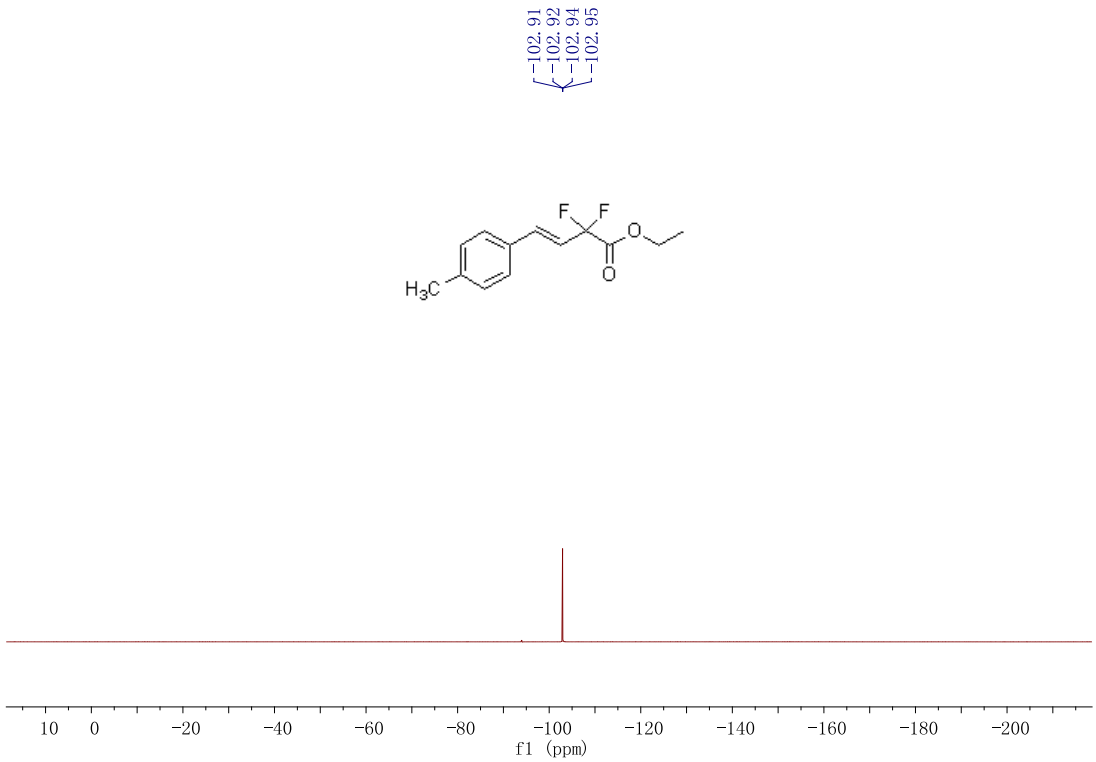
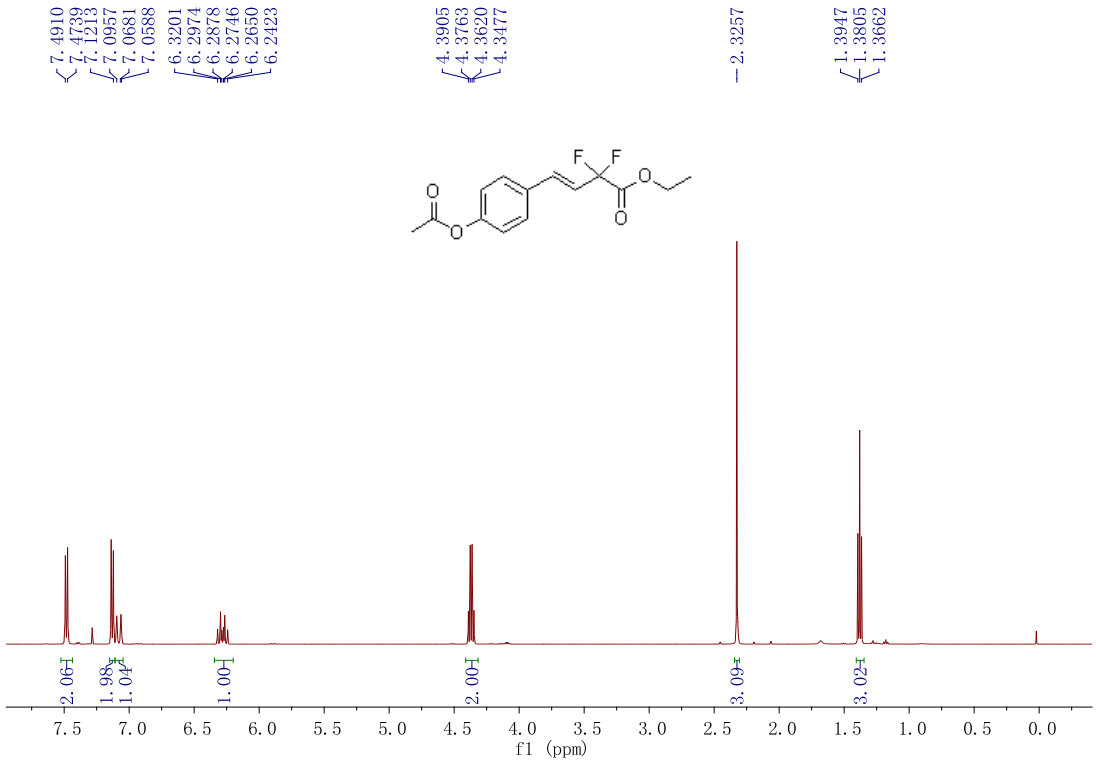
129.56
127.41
118.03
117.78
117.53
115.37
112.90
110.43
63.06
21.33
13.96
F
F
O
O
H3C
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-102.91
-102.92
-102.94
-102.95
F
F
O
O
H3C
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.0681
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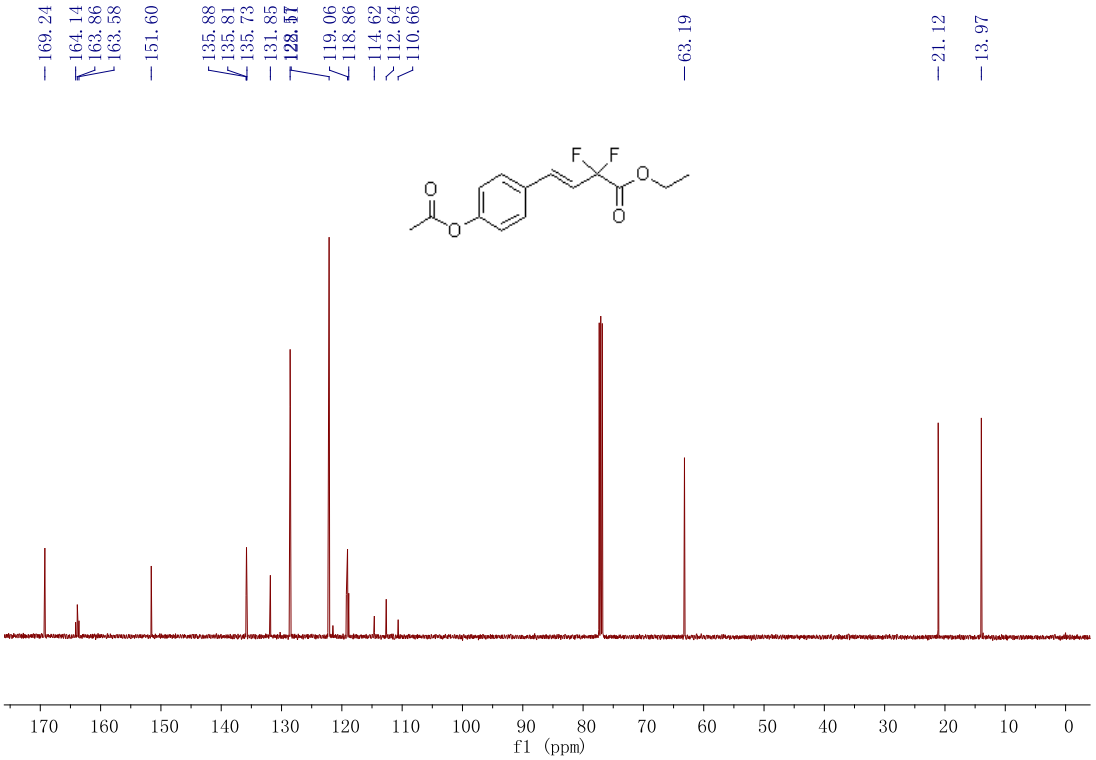
6.2878
6.2746
6.2650
6.2423
4.3905
4.3763
4.3620
4.3477
2.3257
1.3947
1.3805
1.3662
F
F
O
O
O
2.06
1.98
1.04
1.00
2.00
3.09
3.02
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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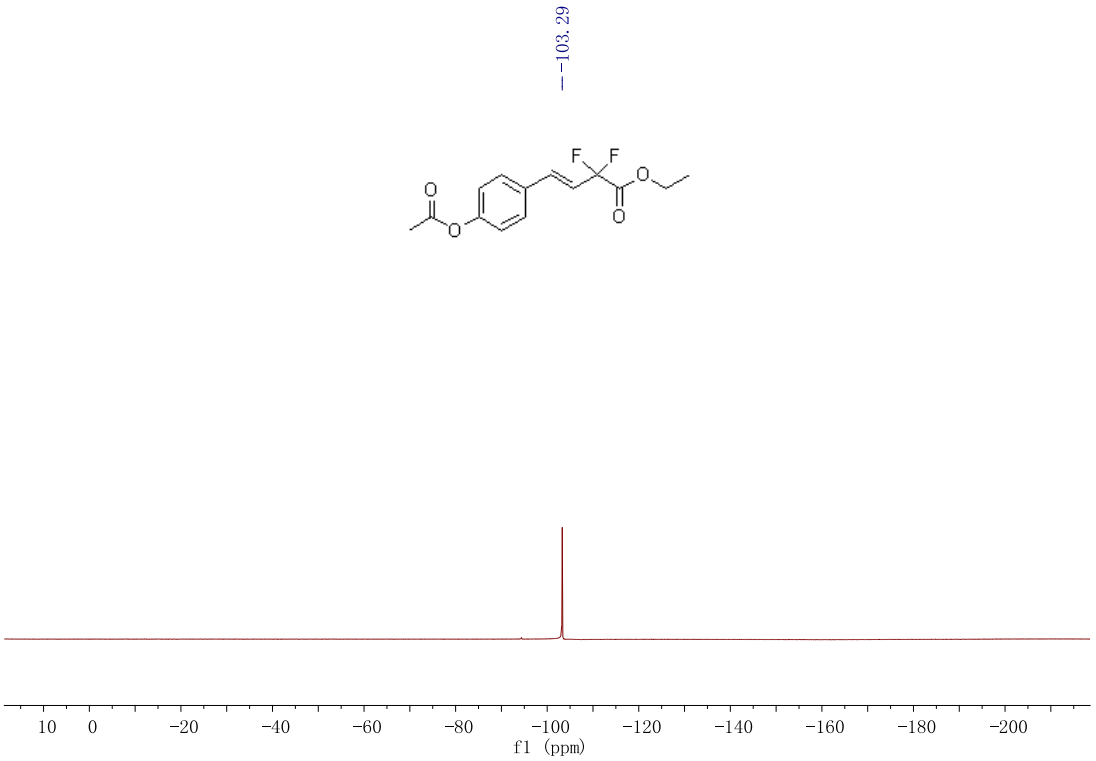
135.88
135.81
135.73
131.85
119.06
118.86
114.62
112.64
110.66
63.19
21.12
13.97
F
F
O
O
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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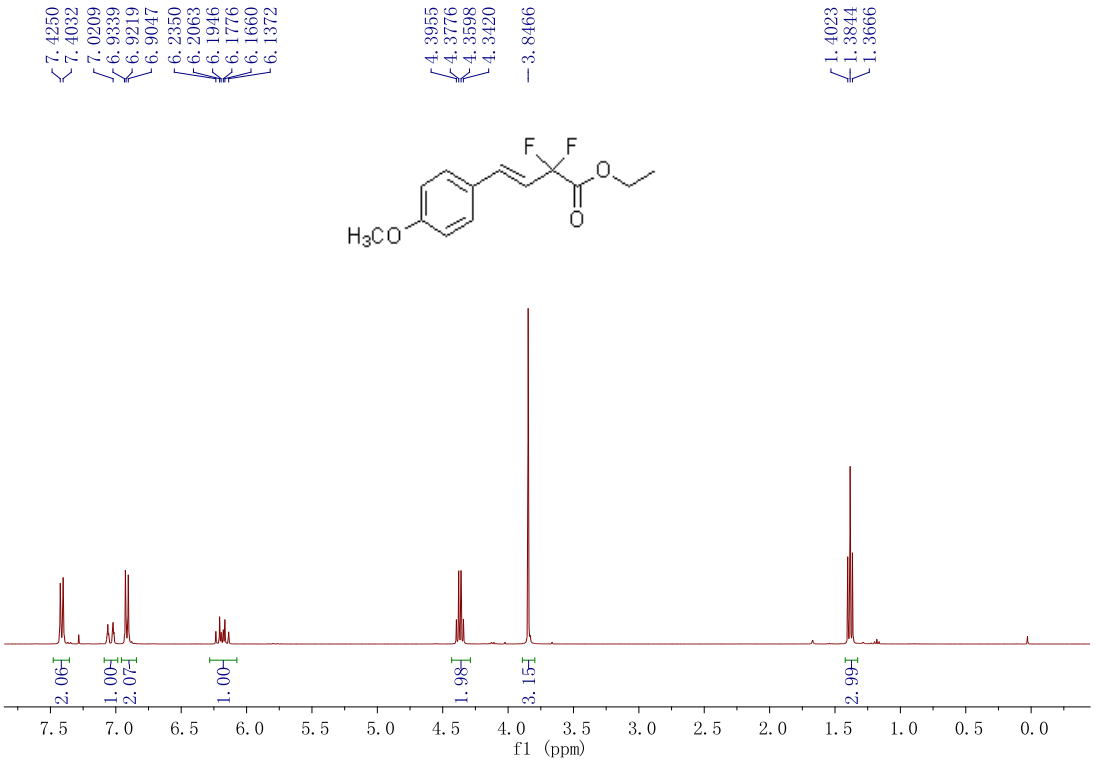
F
F
O
O
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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7.0209
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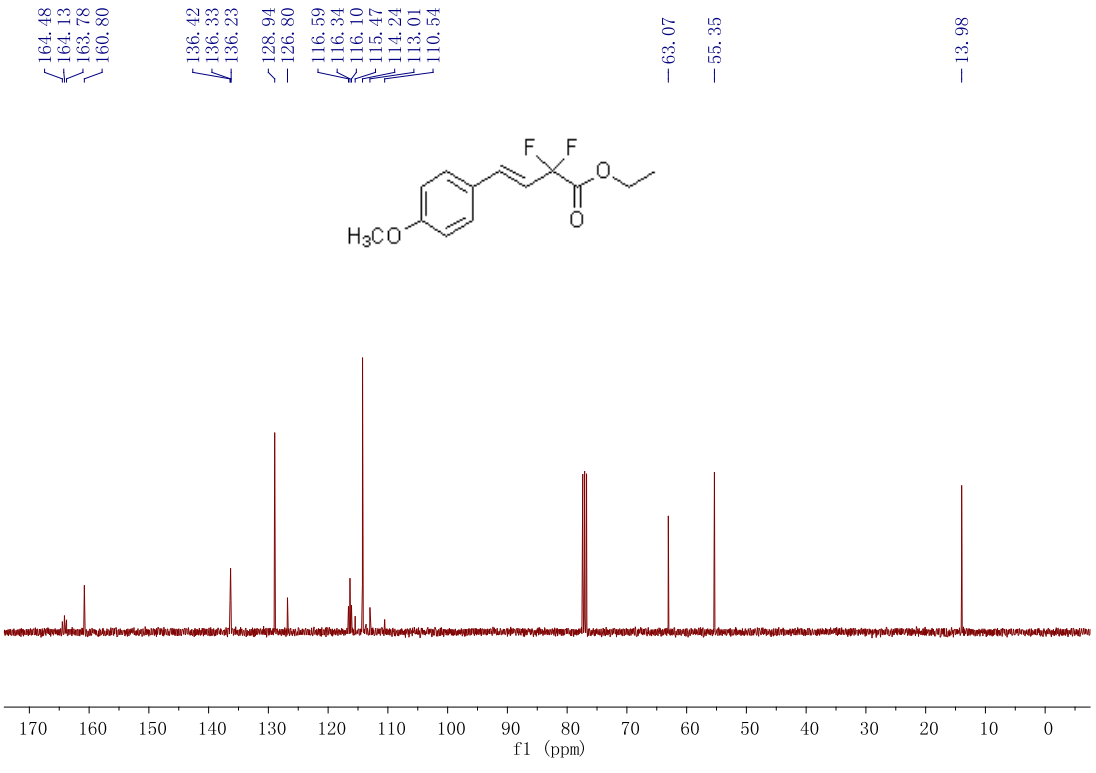
6.9219
6.9047
6.2350
6.2063
6.1946
6.1776
6.1660
6.1372
4.3955
4.3776
4.3598
4.3420
3.8466
1.4023
1.3844
1.3666
F
F
O
O
H3CO
2.06
1.00
2.07
1.00
1.98
3.15
2.99
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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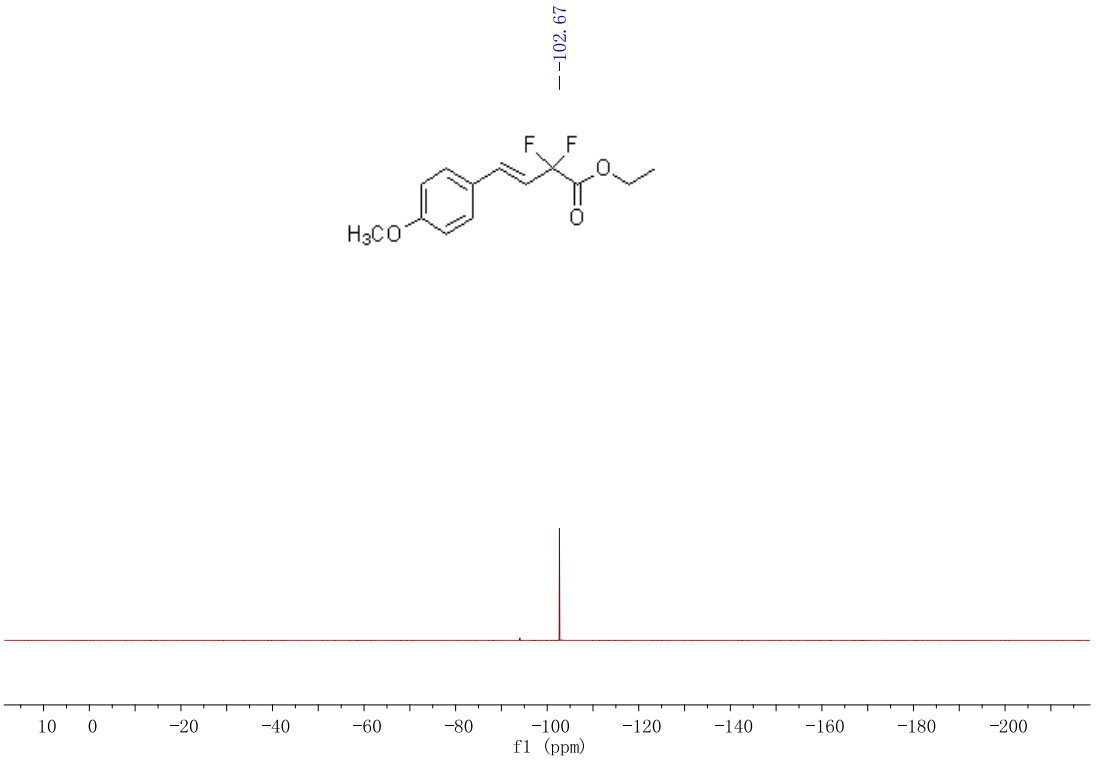
136.33
136.23
128.94
126.80
116.59
116.34
116.10
115.47
114.24
113.01
110.54
63.07
55.35
13.98
F
F
O
O
H3CO
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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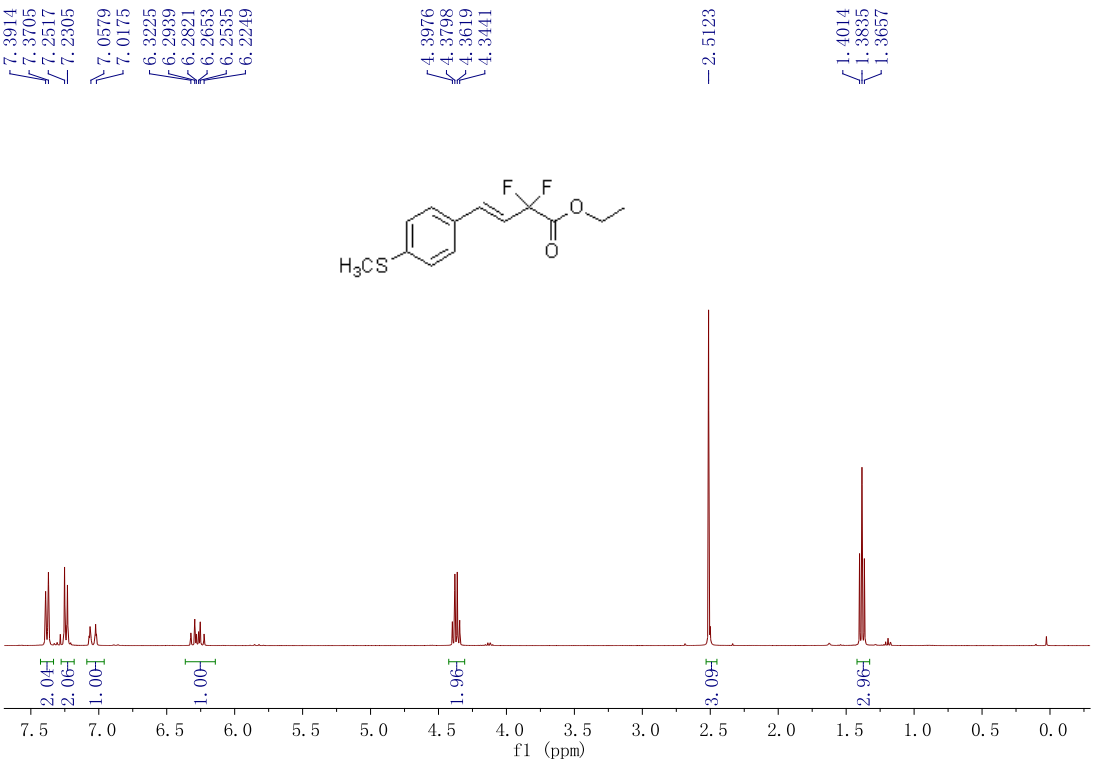
F
F
O
O
H3CO
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.3705
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7.0175
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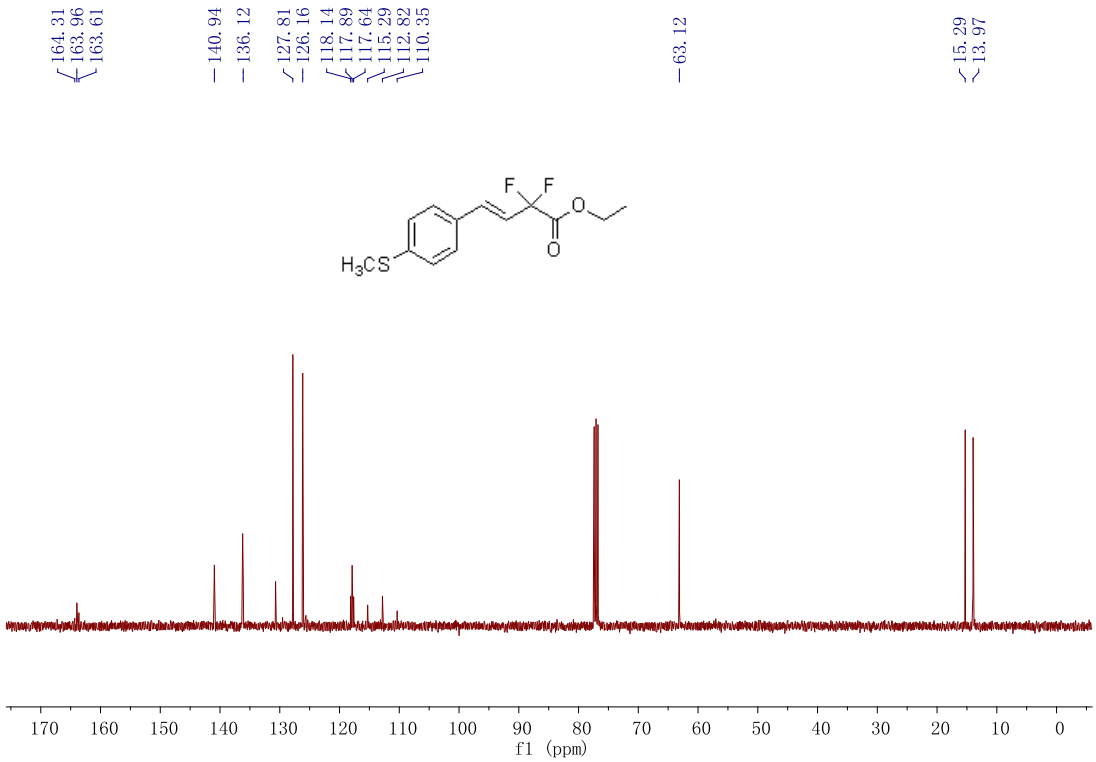
6.2939
6.2821
6.2653
6.2535
6.2249
4.3976
4.3798
4.3619
4.3441
2.5123
1.4014
1.3835
1.3657
F
F
O
O
H3CS
2.04
2.06
1.00
1.00
1.96
3.09
2.96
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


164.31
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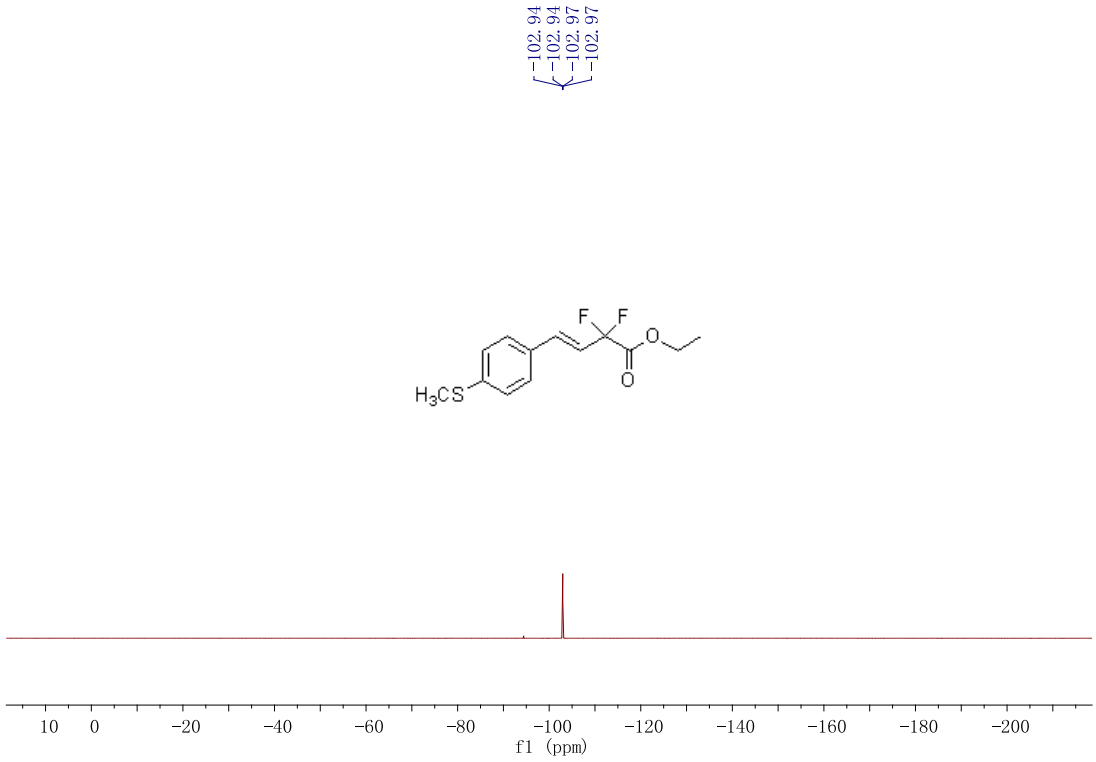
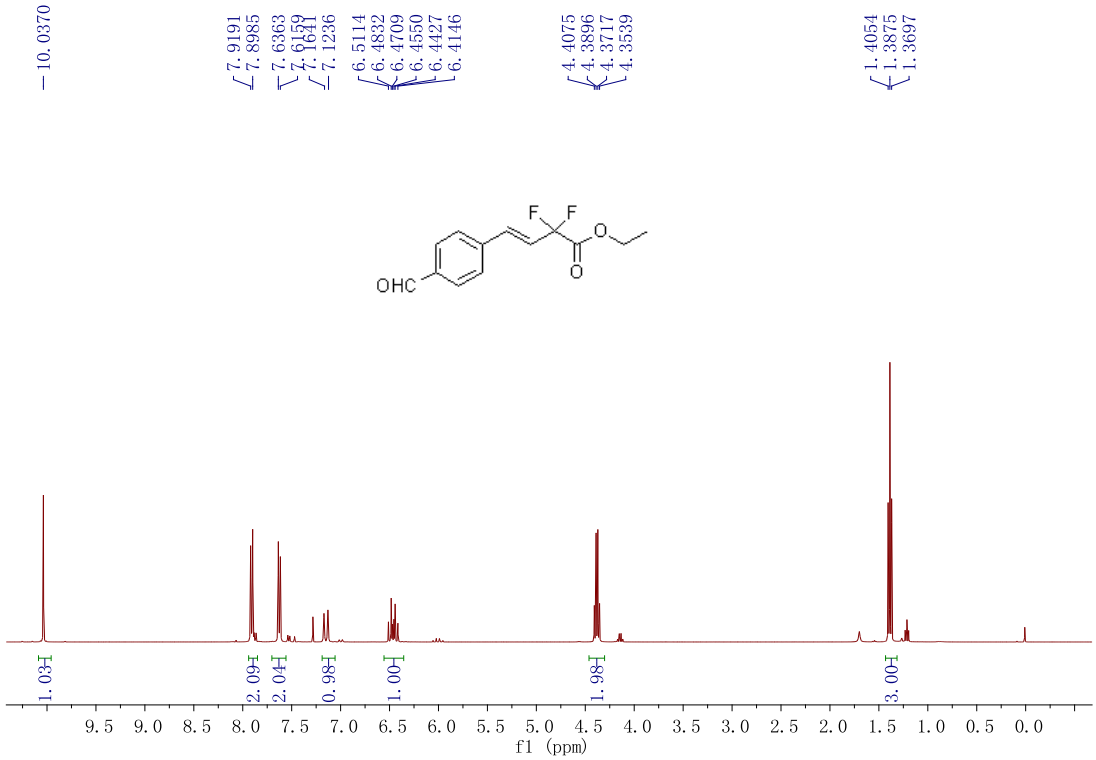
163.61
140.94
136.12
127.81
126.16
118.14
117.89
117.64
115.29
112.82
110.35
63.12
15.29
13.97
F
F
O
O
H3CS
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-102.94
-102.94
-102.97
-102.97
F
F
O
O
H3CS
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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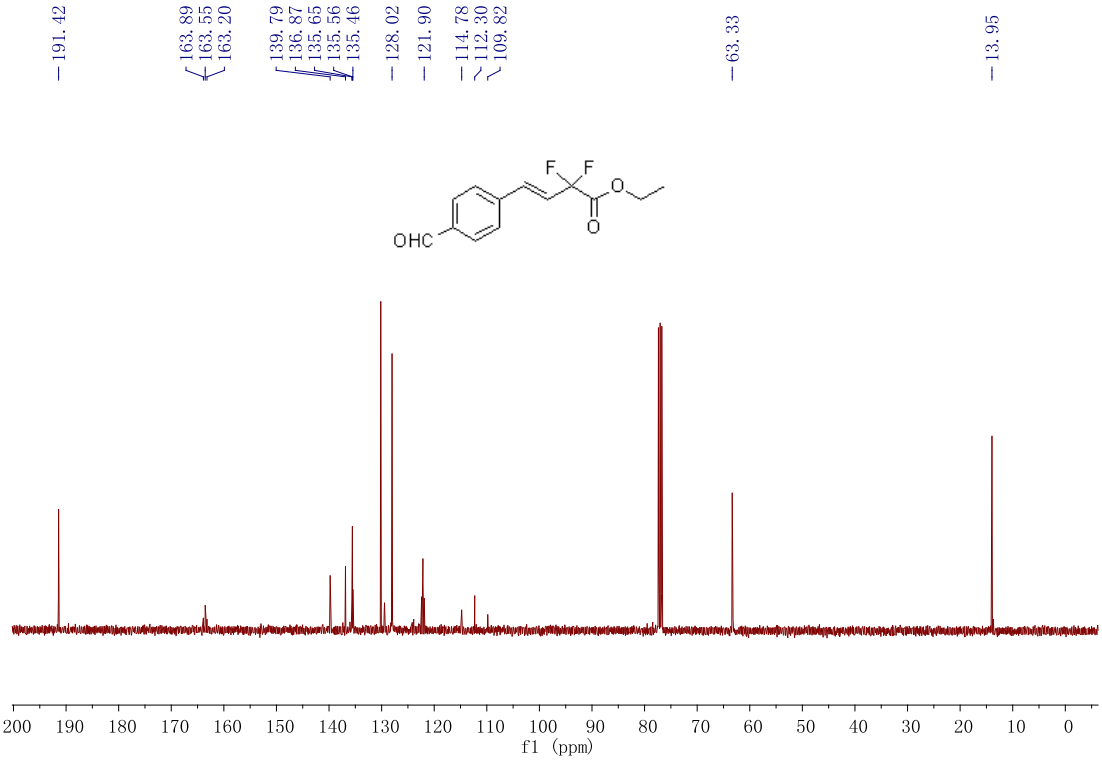
6.4709
6.4550
6.4427
6.4146
4.4075
4.3896
4.3717
4.3539
1.4054
1.3875
1.3697
F
F
O
O
OHC
1.03
2.09
2.04
0.98
1.00
1.98
3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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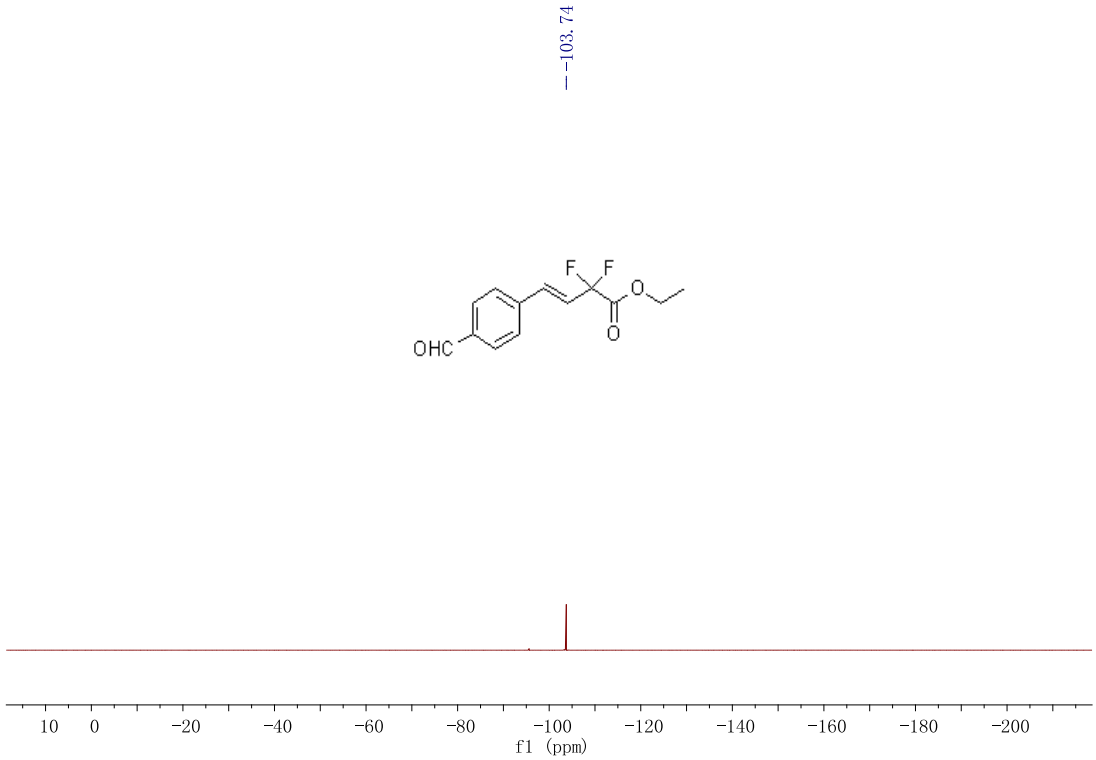
135.56
135.46
128.02
121.90
114.78
112.30
109.82
63.33
13.95
F
F
O
O
OHC
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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F
F
O
O
OHC
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0
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-60
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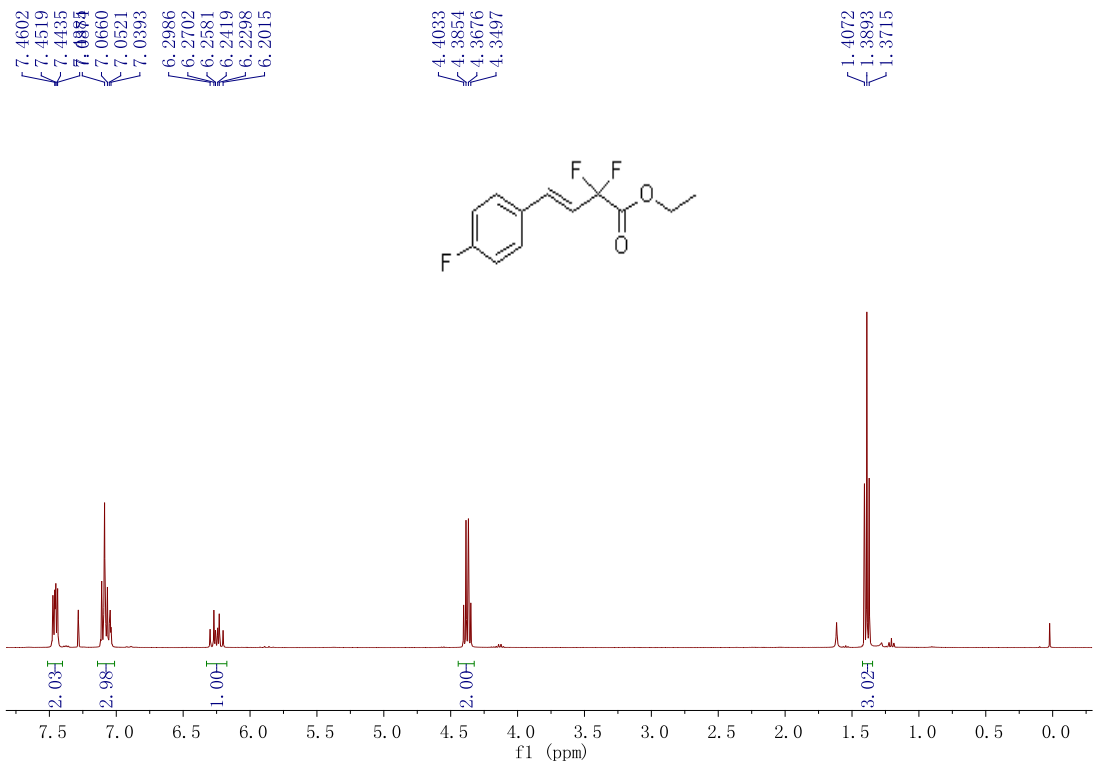
-120
-140
-160
-180
-200
f1 (ppm)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6.2702
6.2581
6.2419
6.2298
6.2015
4.4033
4.3854
4.3676
4.3497
1.4072
1.3893
1.3715
F
F
O
O
F
2.03
2.98
1.00
2.00
3.02
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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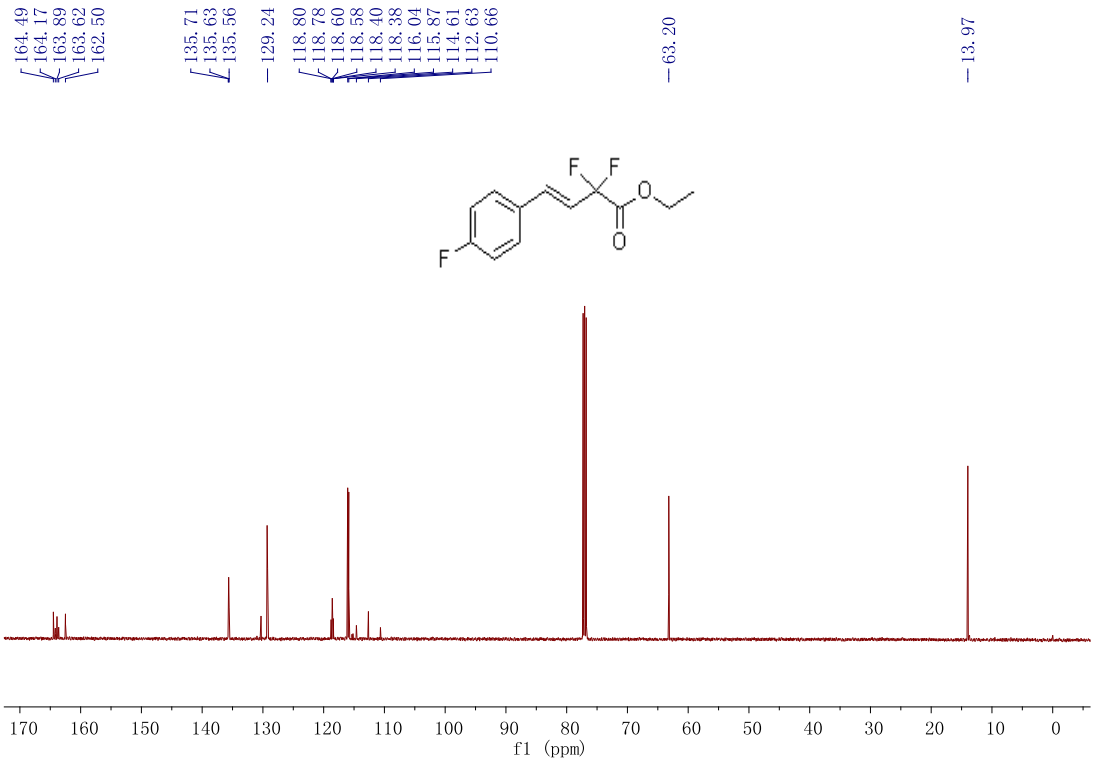
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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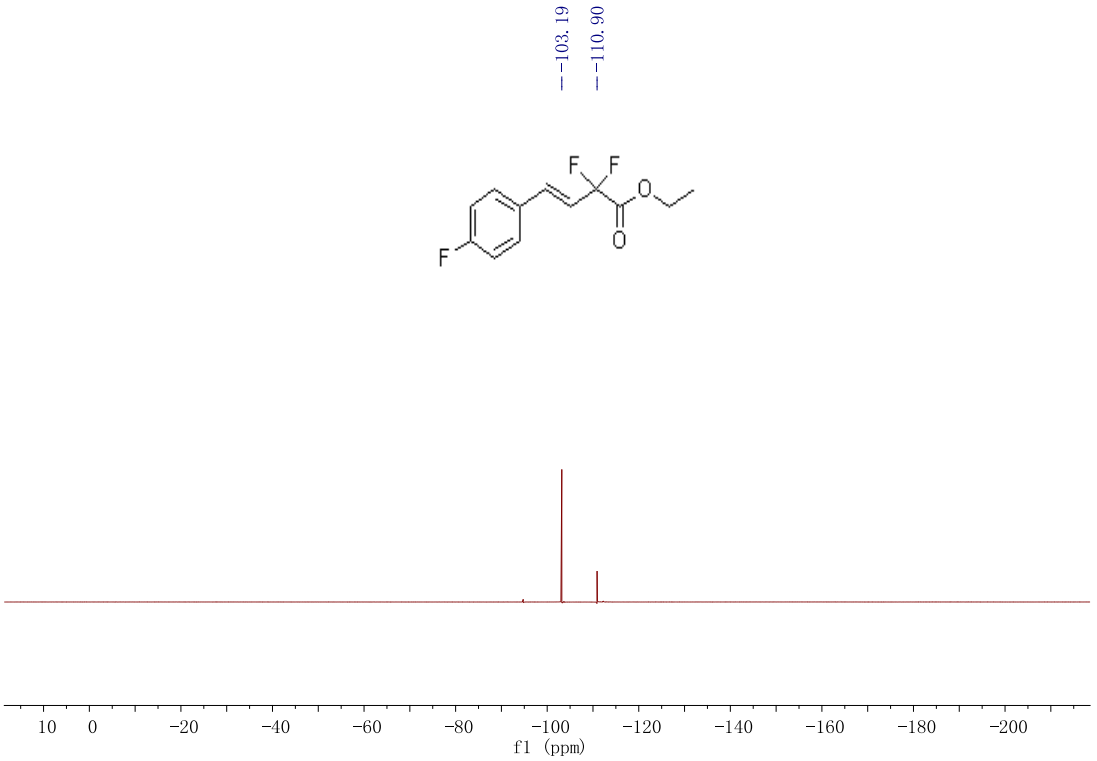
118.60
118.58
118.40
118.38
116.04
115.87
114.61
112.63
110.66
63.20
13.97
F
F
O
O
F
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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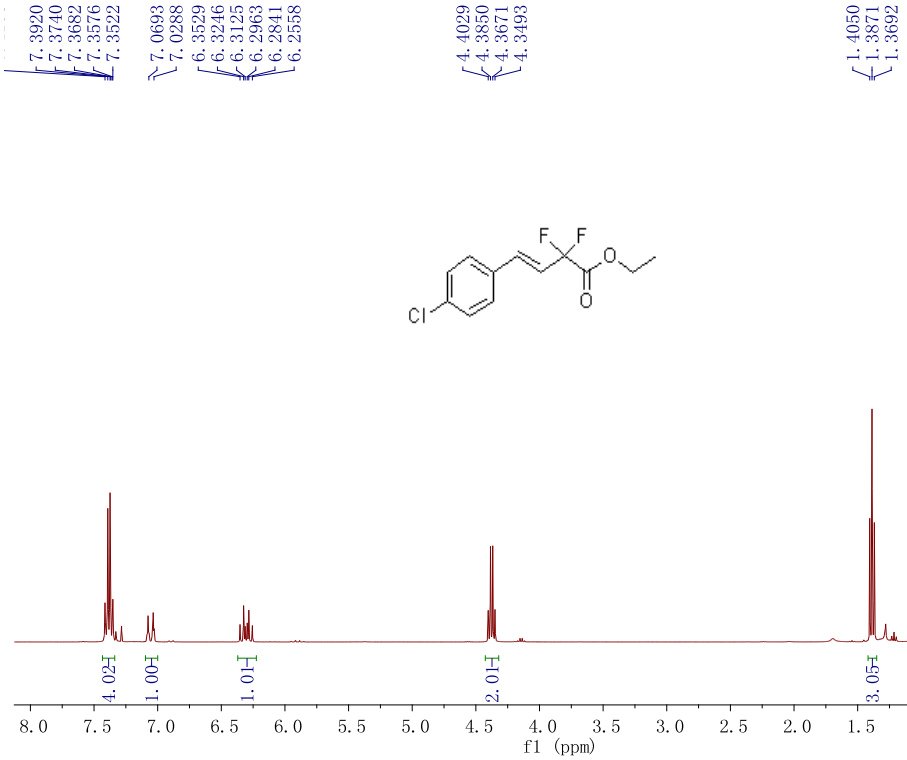
-110.90
F
F
O
O
F
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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6.2963
6.2841
6.2558
4.4029
4.3850
4.3671
4.3493
1.4050
1.3871
1.3692
F
F
O
O
Cl
4.02
1.00
1.01
2.01
3.05
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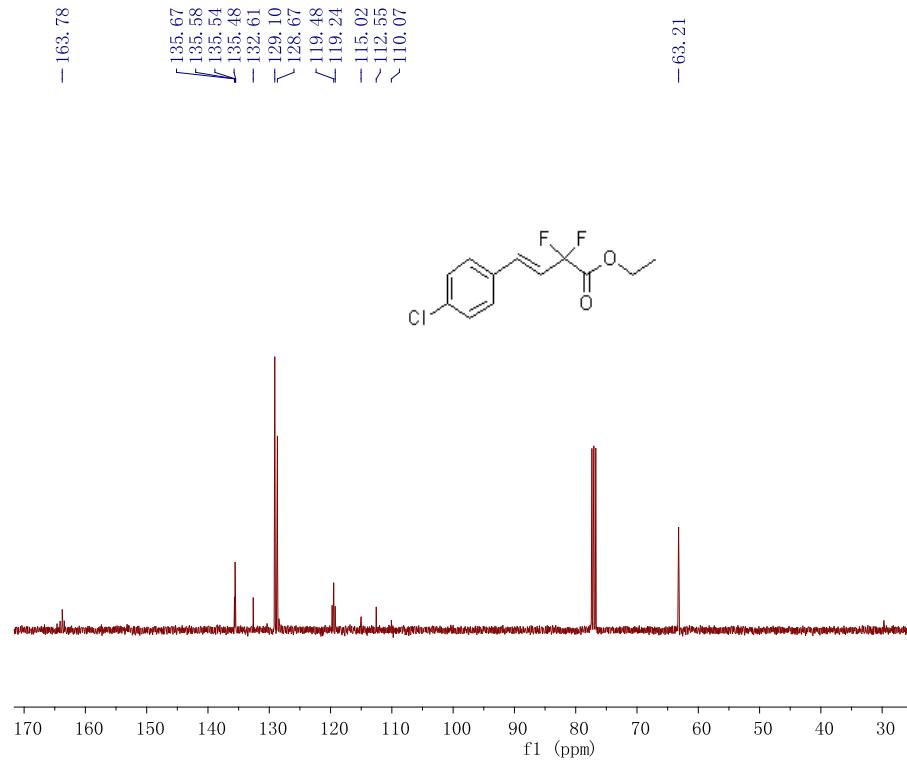
f1 (ppm)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119.24
115.02
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13.95
F
F
O
O
Cl
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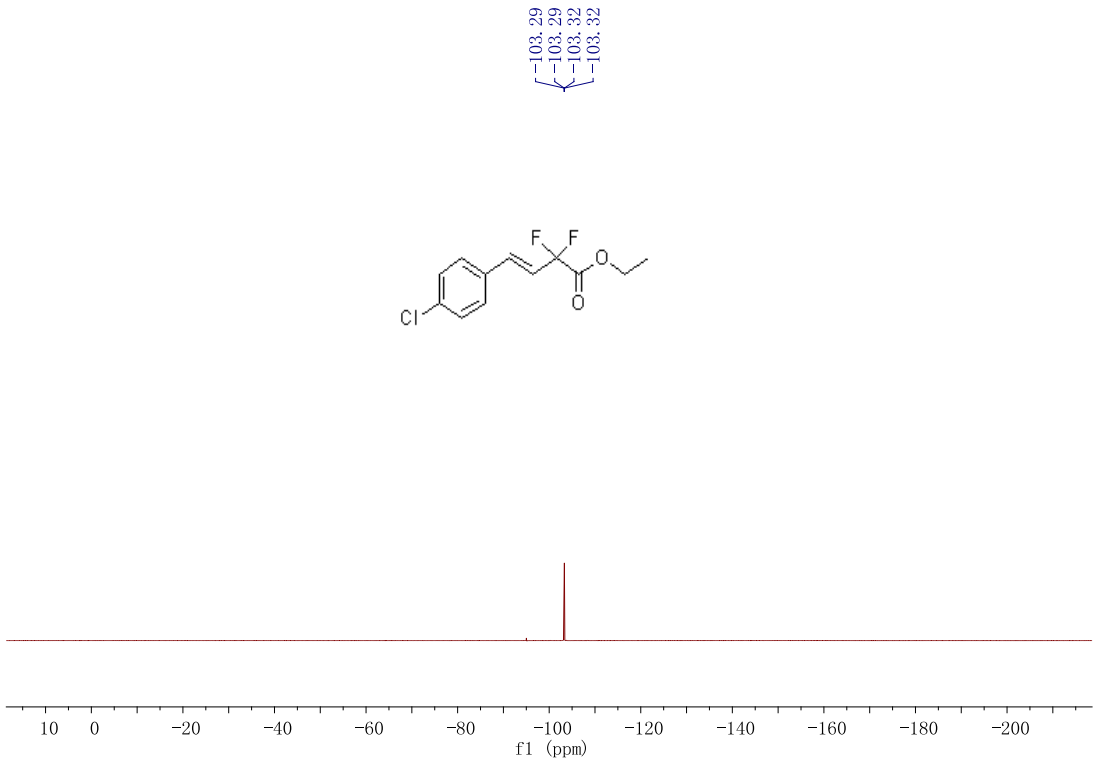
f1 (ppm)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F
F
O
O
Cl
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-40
-60
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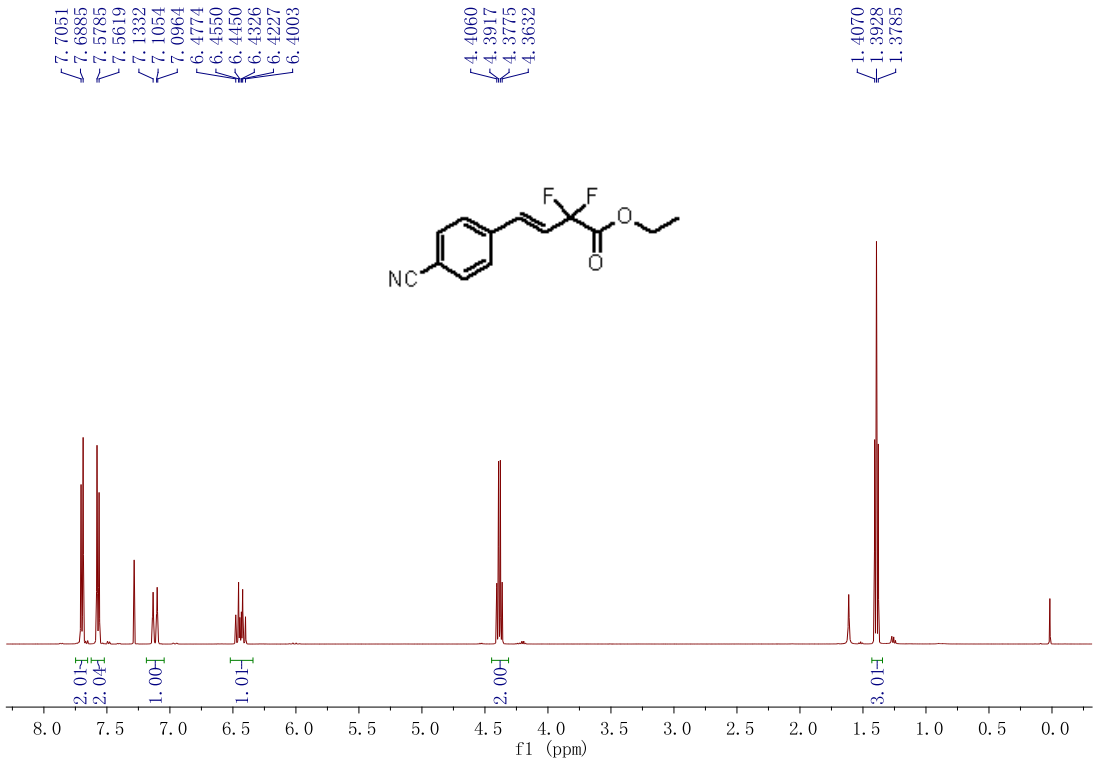
-100
-120
-140
-160
-180
-200
f1 (ppm)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6.4227
6.4003
4.4060
4.3917
4.3775
4.3632
1.4070
1.3928
1.3785
F
F
O
O
NC
2.01
2.04
1.00
1.01
2.00
3.01
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.5
3.0
2.5
2.0
1.5
1.0
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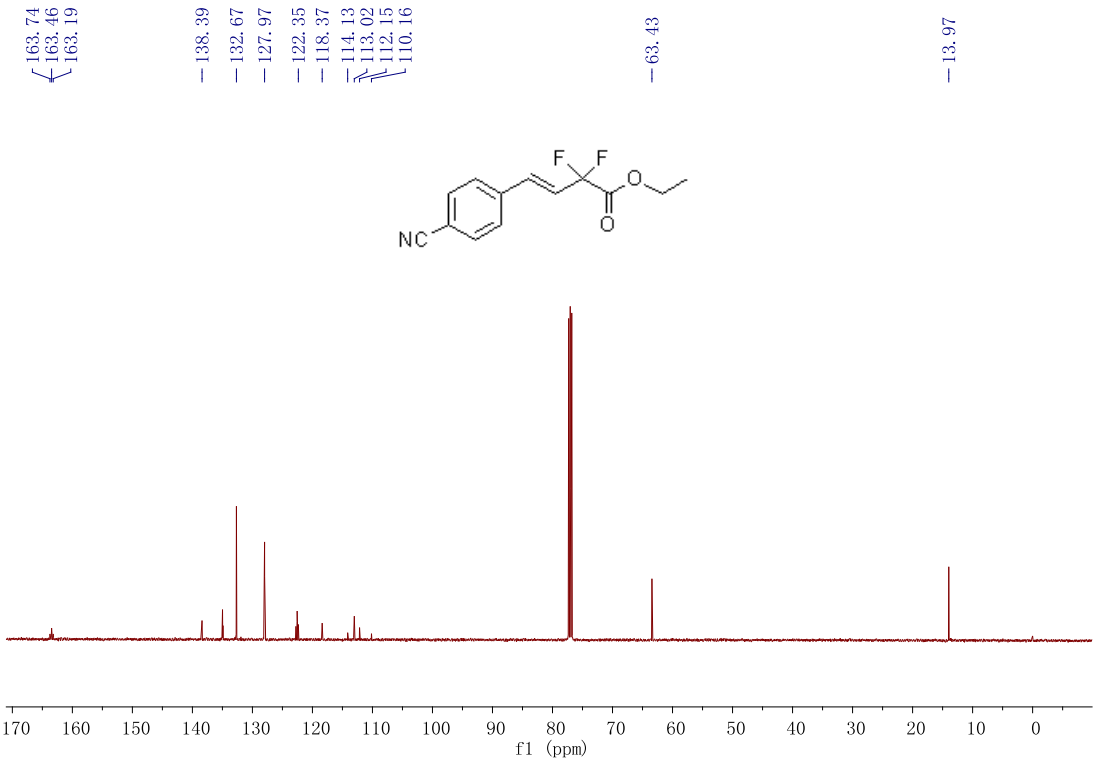
0.0
f1 (ppm)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127.97
122.35
118.37
114.13
113.02
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110.16
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13.97
F
F
O
O
NC
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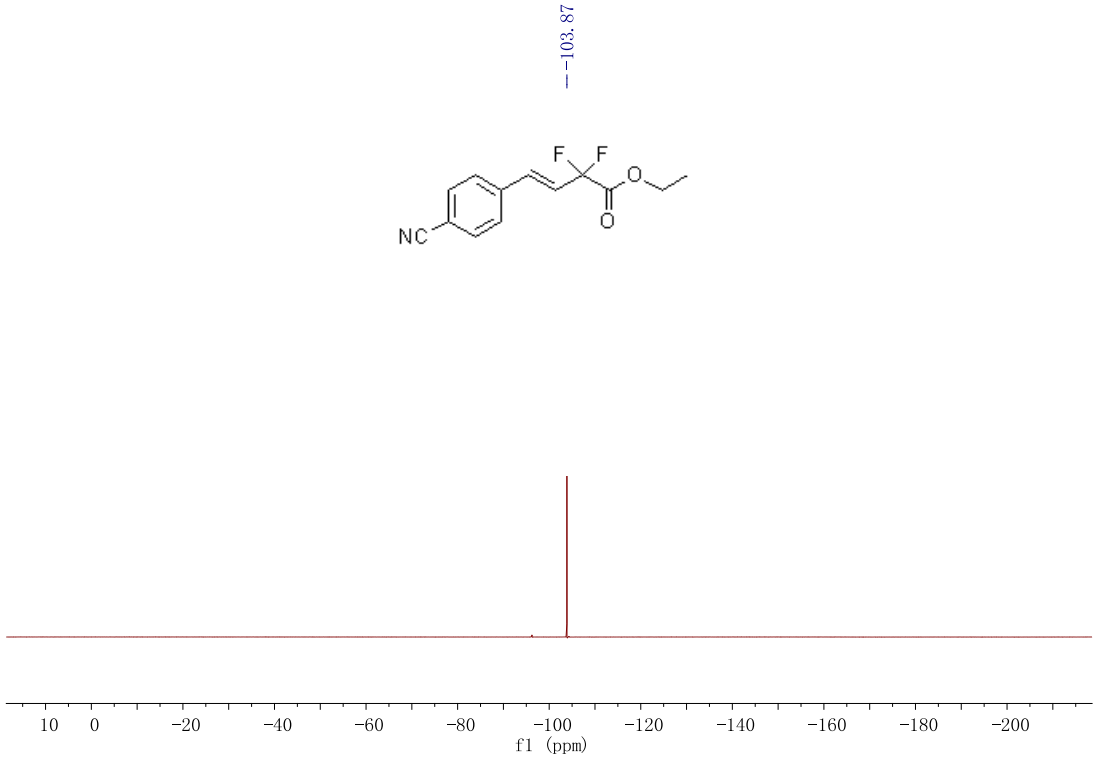
f1 (ppm)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F
F
O
O
NC
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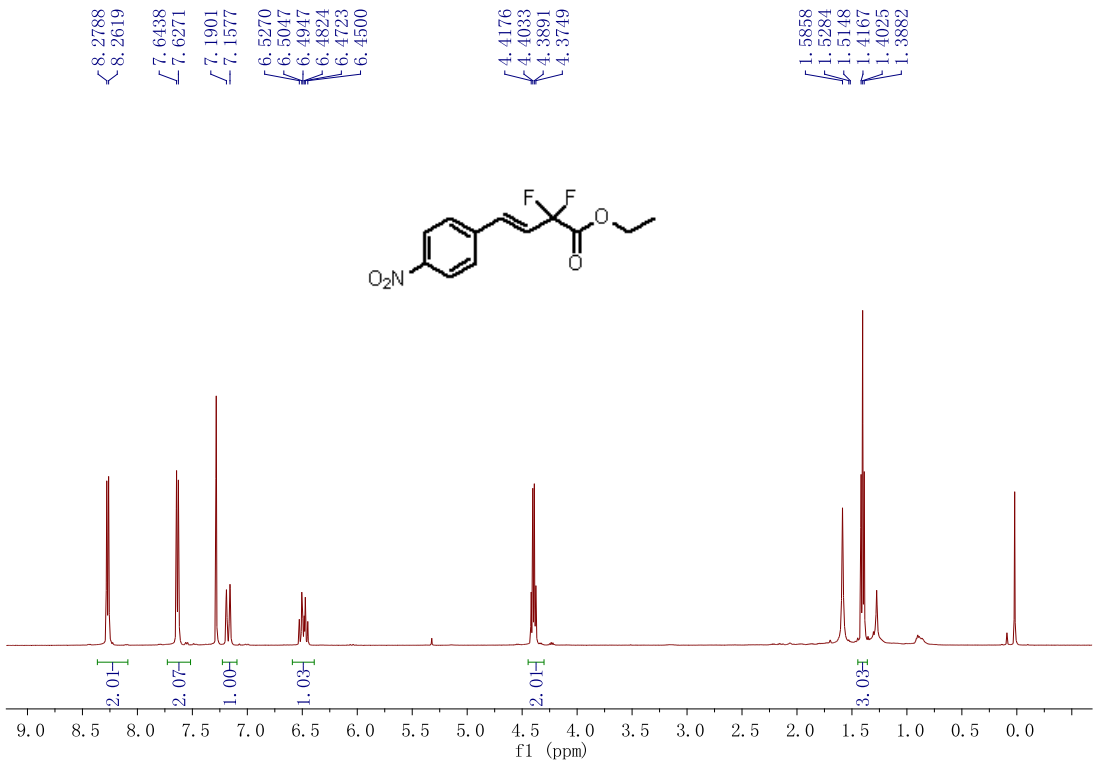
f1 (ppm)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4.4033
4.3891
4.3749
1.5858
1.5284
1.5148
1.4167
1.4025
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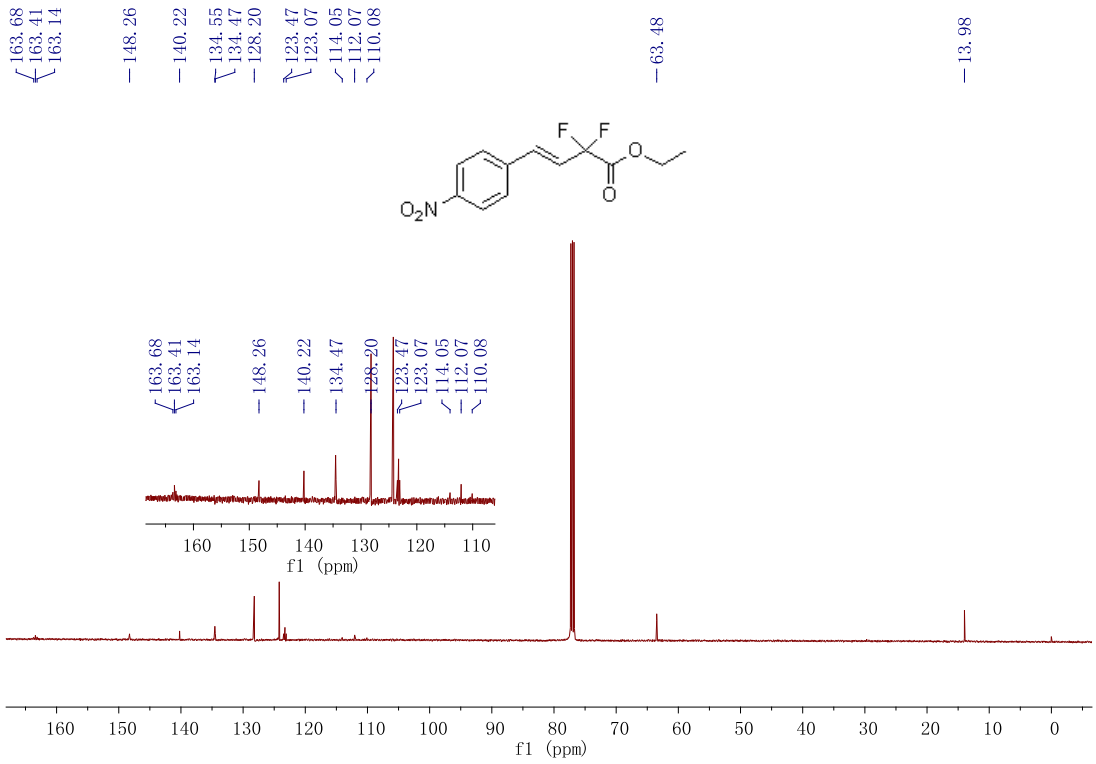
F
F
O
O
O2N
2.01
2.07
1.00
1.03
2.01
3.03
f1 (ppm)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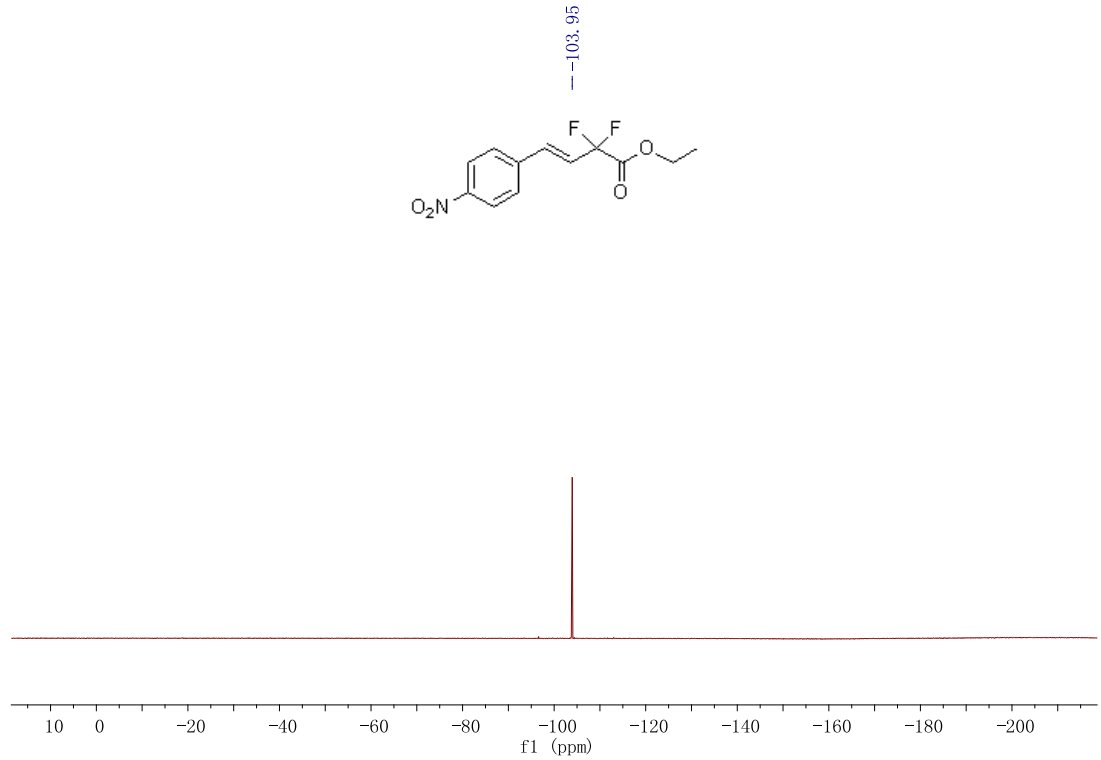
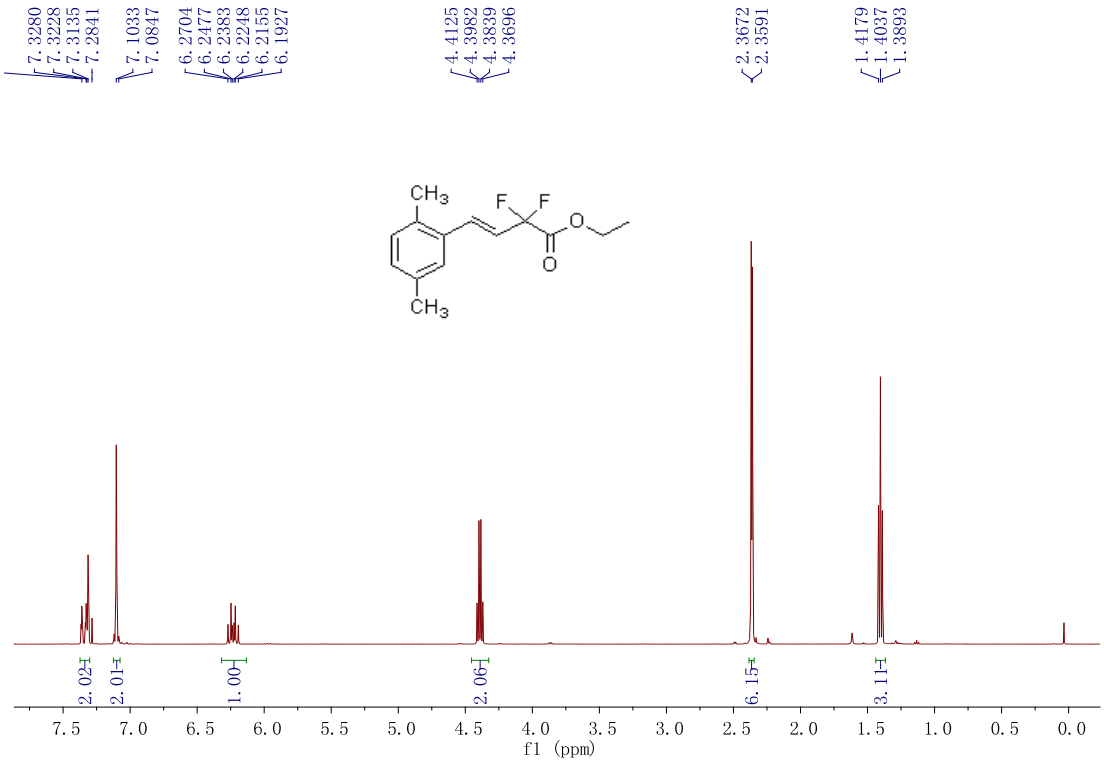
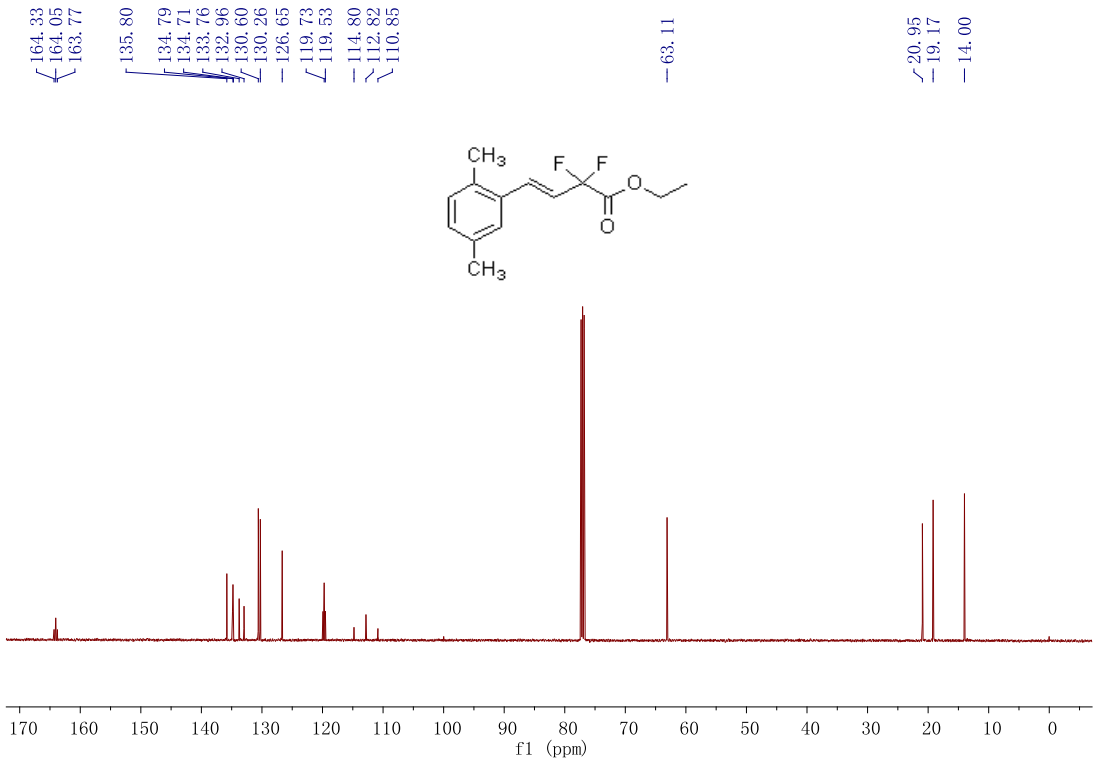
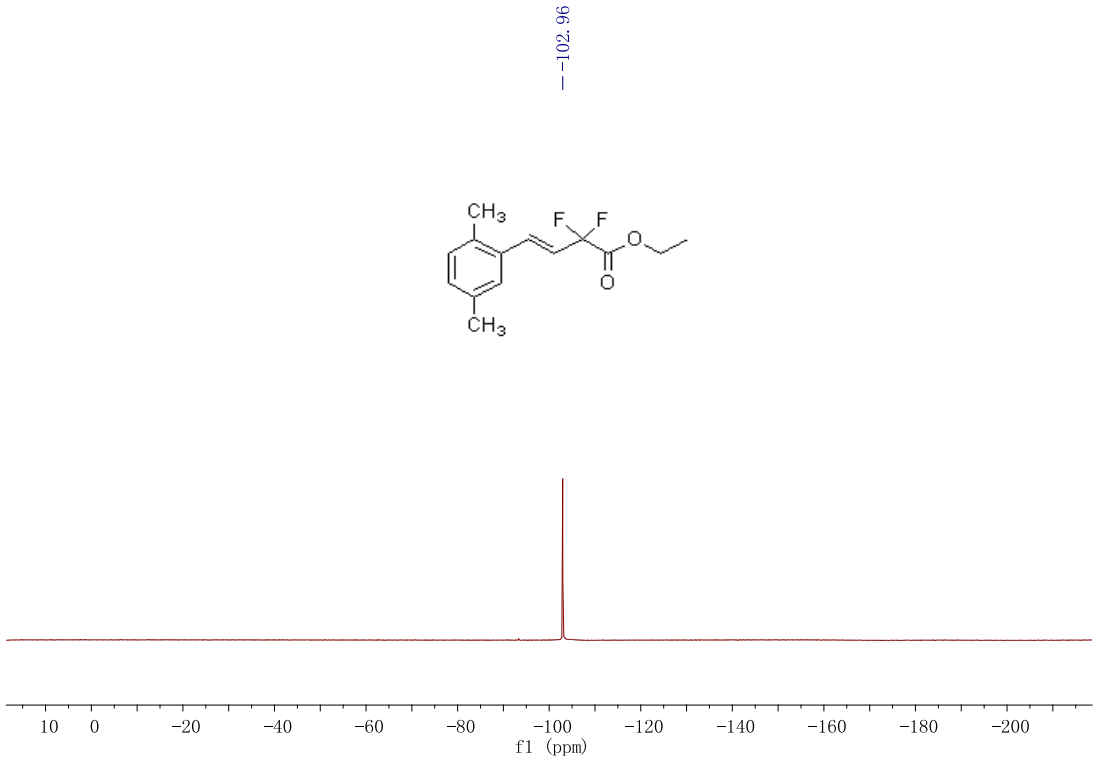
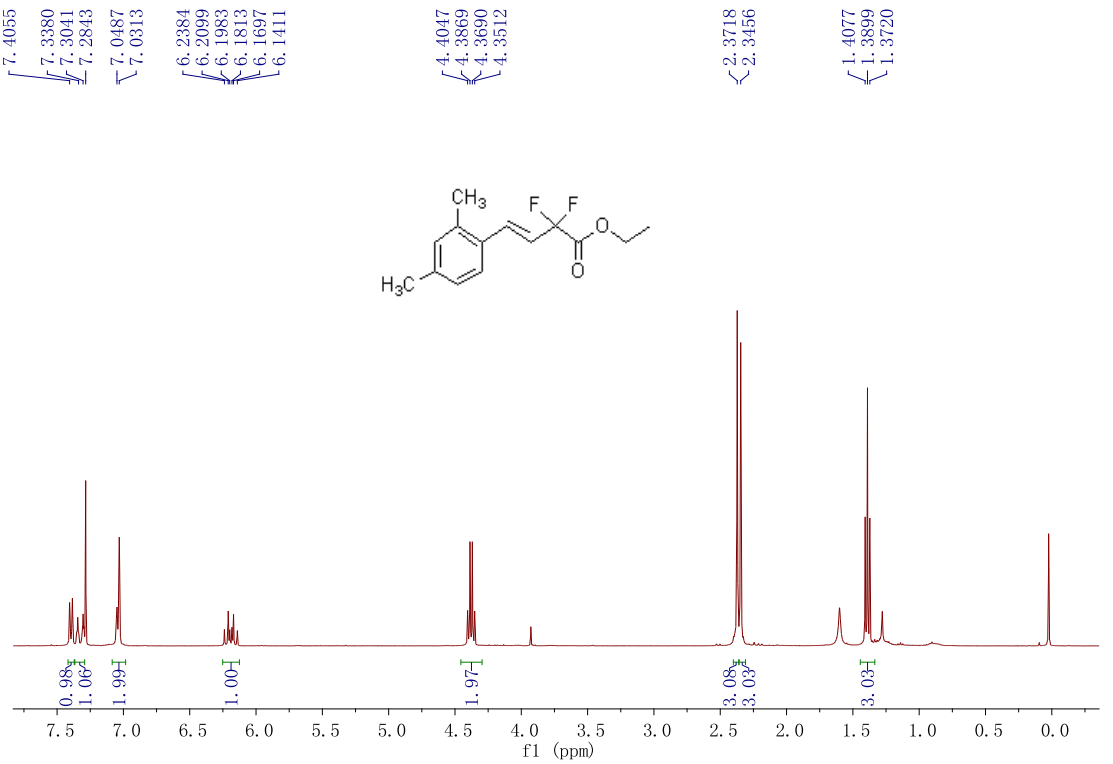
148.26
140.22
134.55
134.47
128.20
123.47
123.07
114.05
112.07
110.08
63.48
13.98
F
F
O
O
O2N
f1 (ppm)

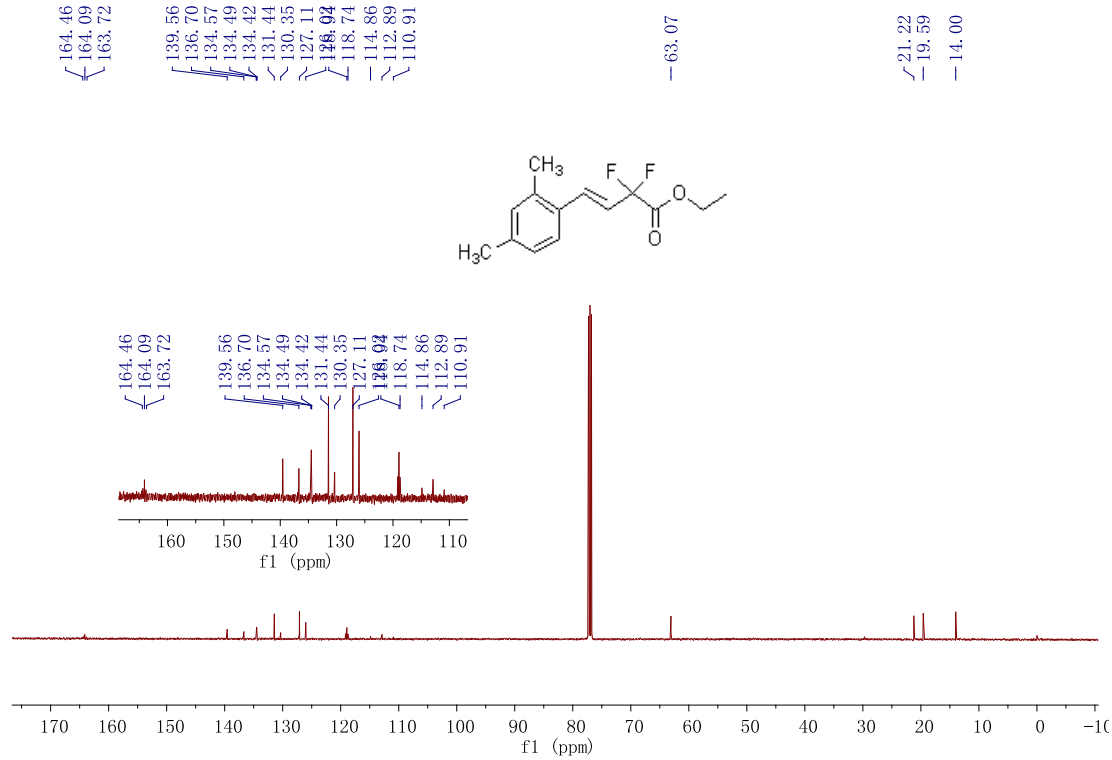

-103.95
F
F
O
O
O2N
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)

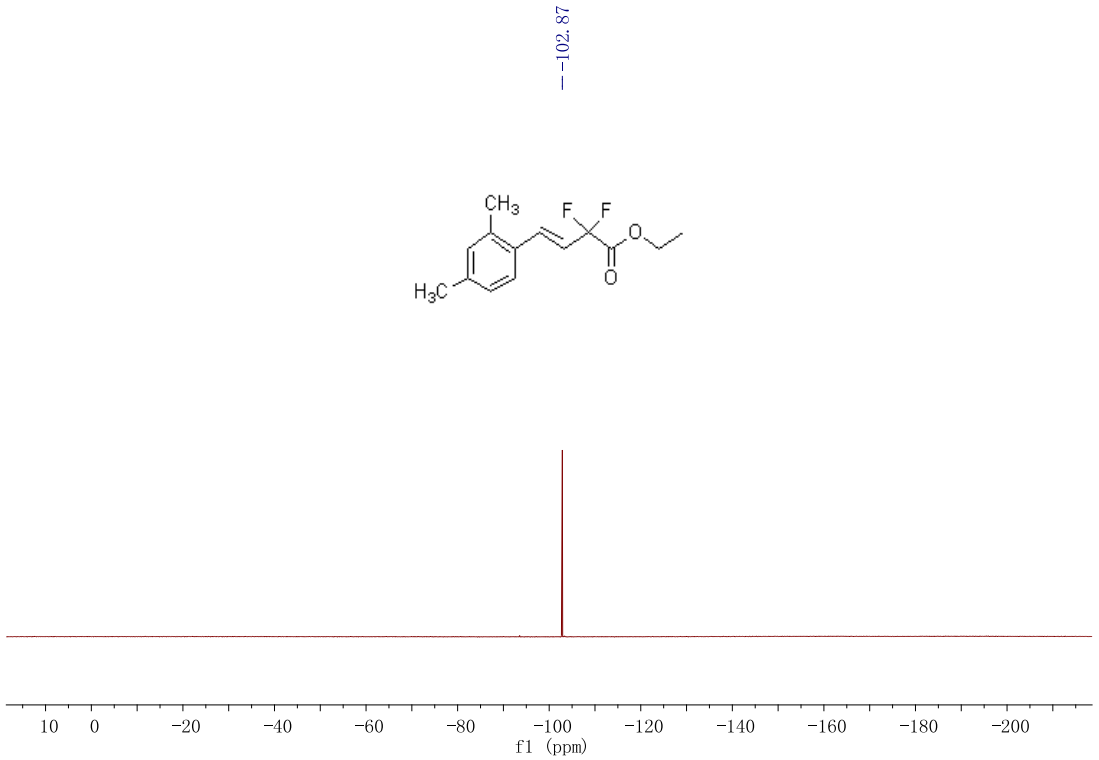

7.3280
7.3228
7.3135
7.2841
7.1033
7.0847
6.2704
6.2477
6.2383
6.2248
6.2155
6.1927
4.4125
4.3982
4.3839
4.3696
2.3672
2.3591
1.4179
1.4037
1.3893
CH3
CH3
F
F
O
O
2.02
2.01
1.00
2.06
6.15
3.11
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

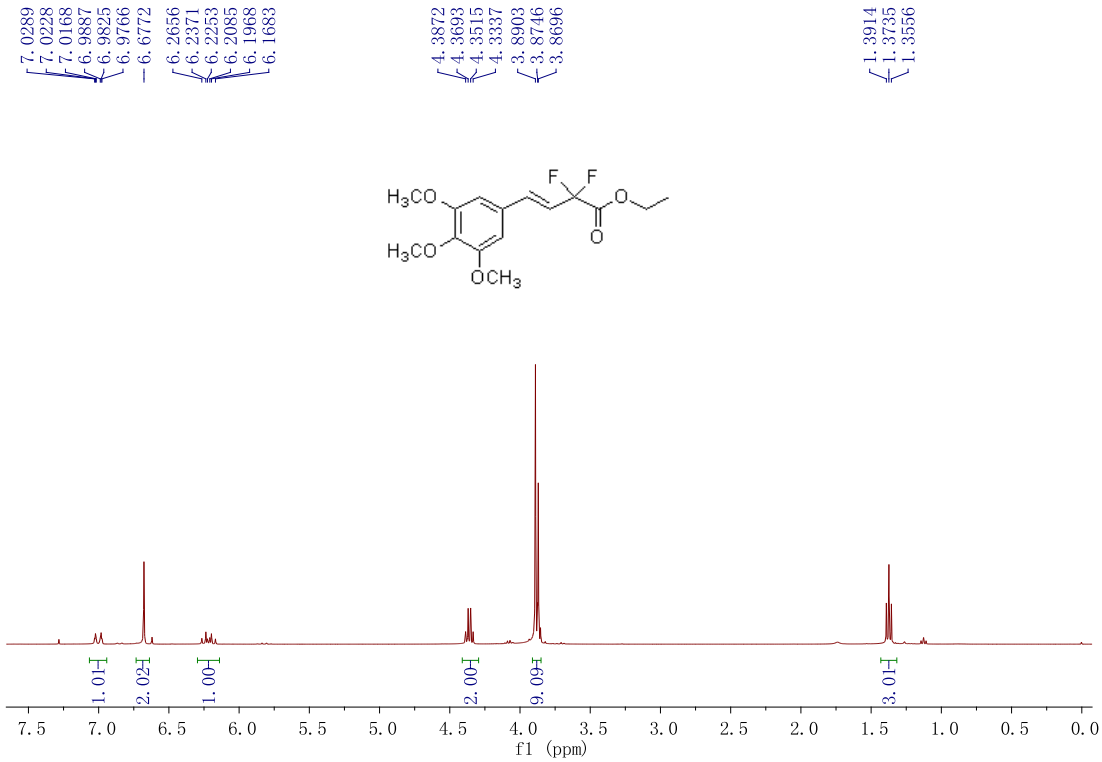

164.33
164.05
163.77
135.80
134.79
134.71
133.76
132.96
130.60
130.26
126.65
119.73
119.53
114.80
112.82
110.85
63.11
20.95
19.17
14.00
CH3
F
F
O
O
CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

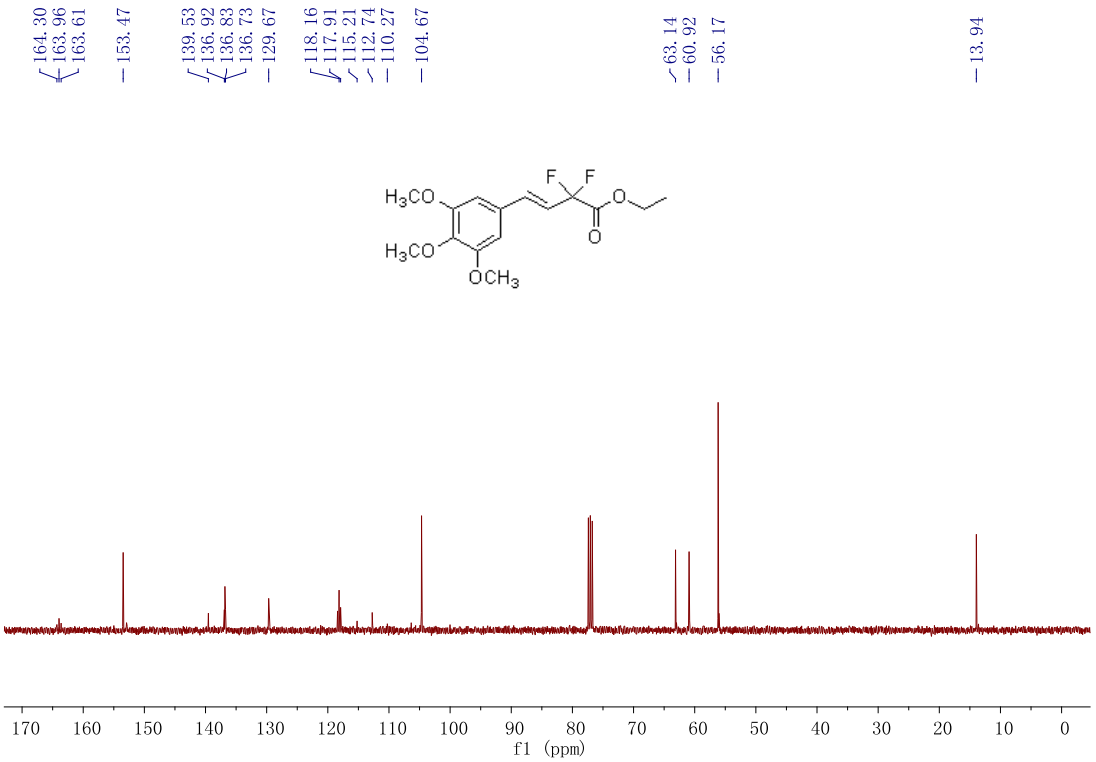

-102.96
CH3
F
F
O
O
CH3
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)

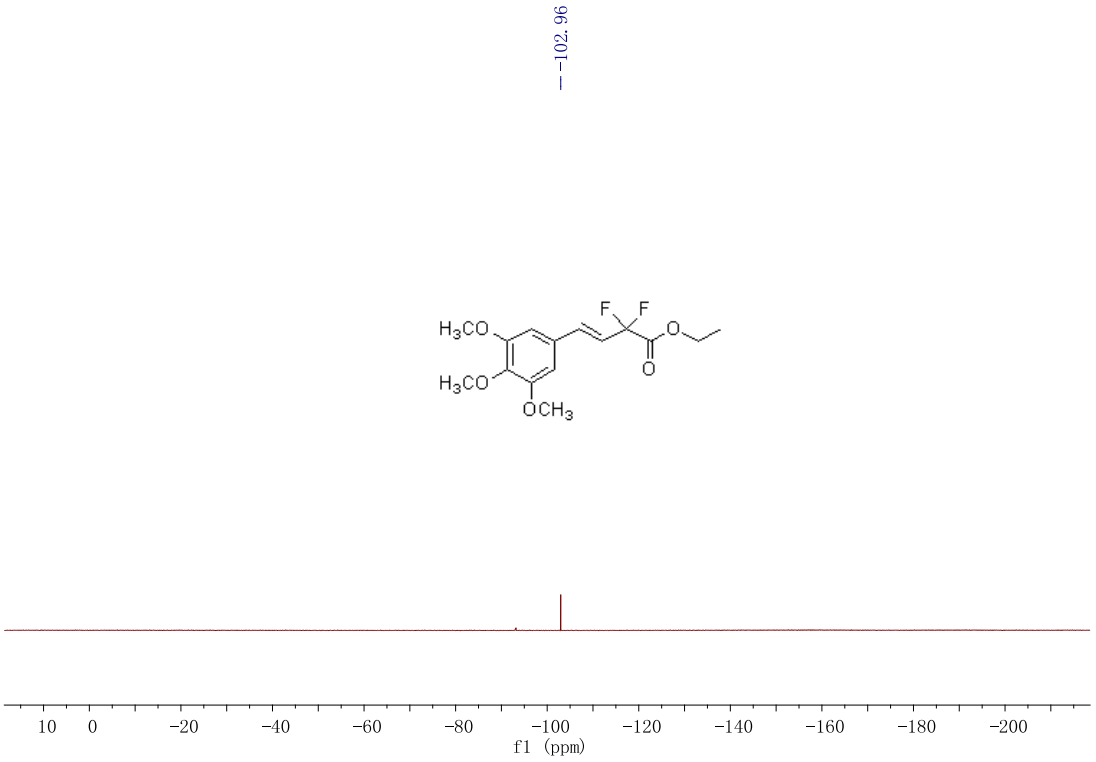

7.4055
7.3380
7.3041
7.2843
7.0487
7.0313
6.2384
6.2099
6.1983
6.1813
6.1697
6.1411
4.4047
4.3869
4.3690
4.3512
2.3718
2.3456
1.4077
1.3899
1.3720
CH3
F
F
O
O
H3C
0.98
1.06
1.99
1.00
1.97
3.08
3.03
3.03
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

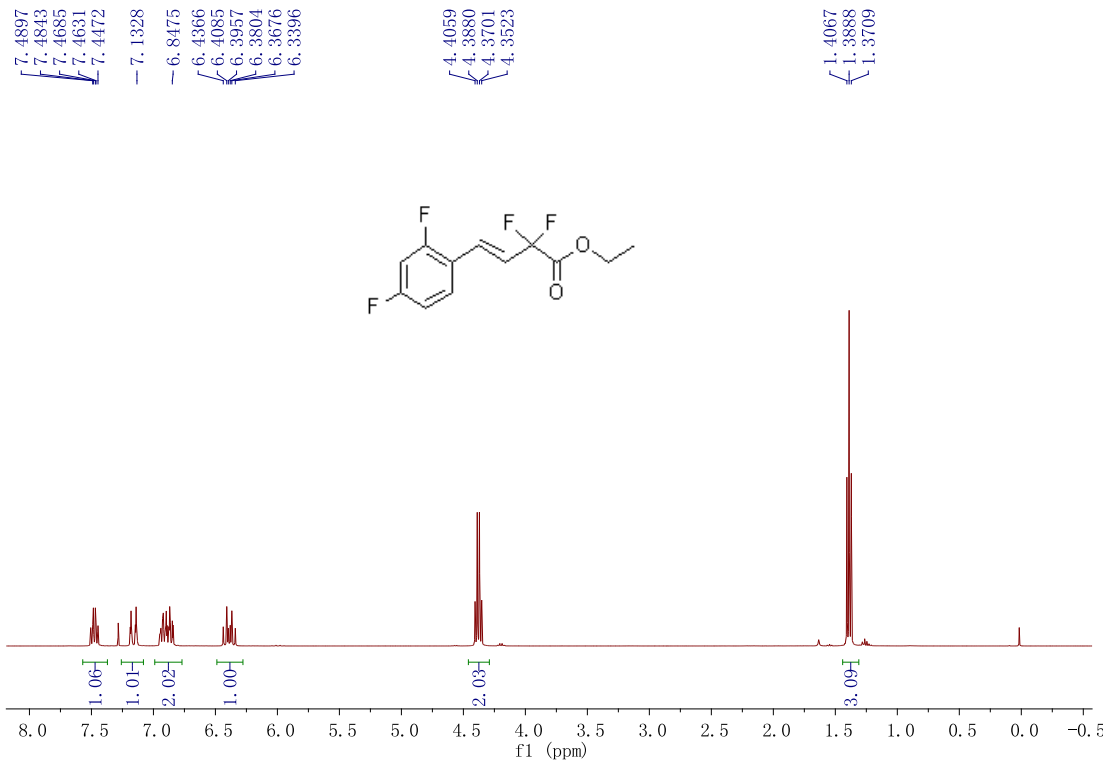

164.46
164.09
163.72
139.56
136.70
134.57
134.49
134.42
131.44
130.35
127.11
118.74
114.86
112.89
110.91
63.07
21.22
19.59
14.00
CH3
F
F
O
O
H3C
160 150 140 130 120 110
f1 (ppm)
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

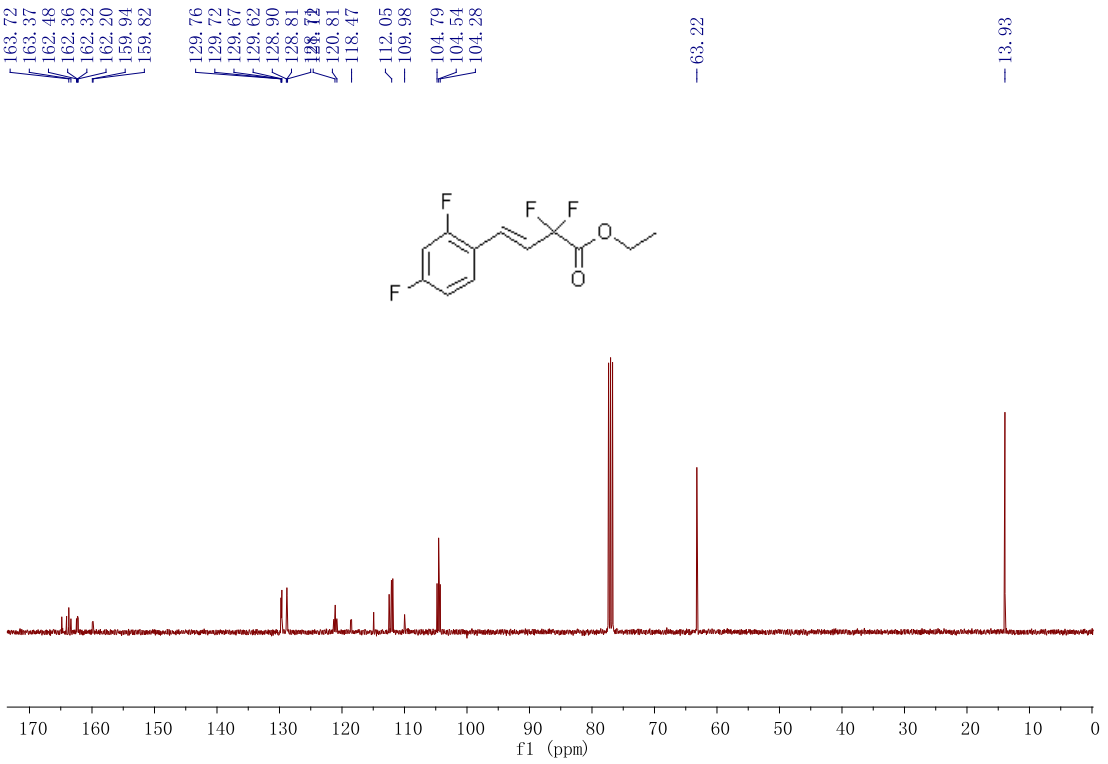

-102.87
CH3
F
F
O
O
H3C
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)

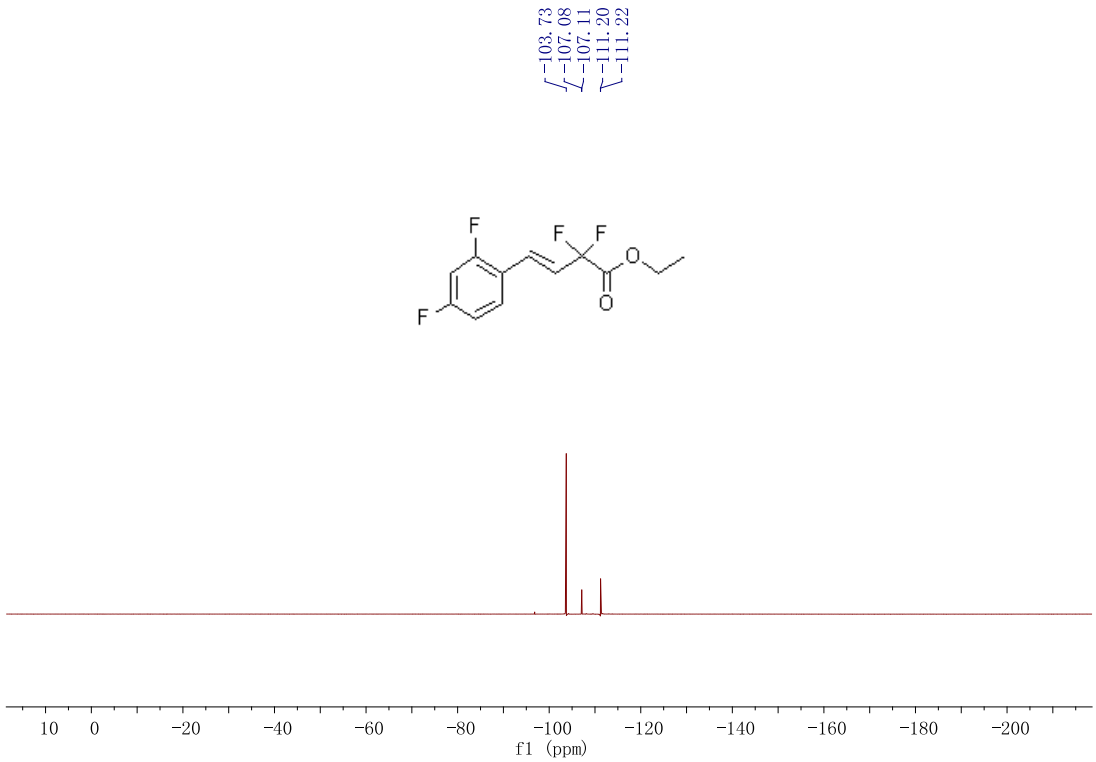

7.0289
7.0228
7.0168
6.9887
6.9825
6.9766
6.6772
6.2656
6.2371
6.2253
6.2085
6.1968
6.1683
4.3872
4.3693
4.3515
4.3337
3.8903
3.8746
3.8696
1.3914
1.3735
1.3556
F
F
H3CO
H3CO
OCH3
O
O
1.01
2.02
1.00
2.00
9.09
3.01
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

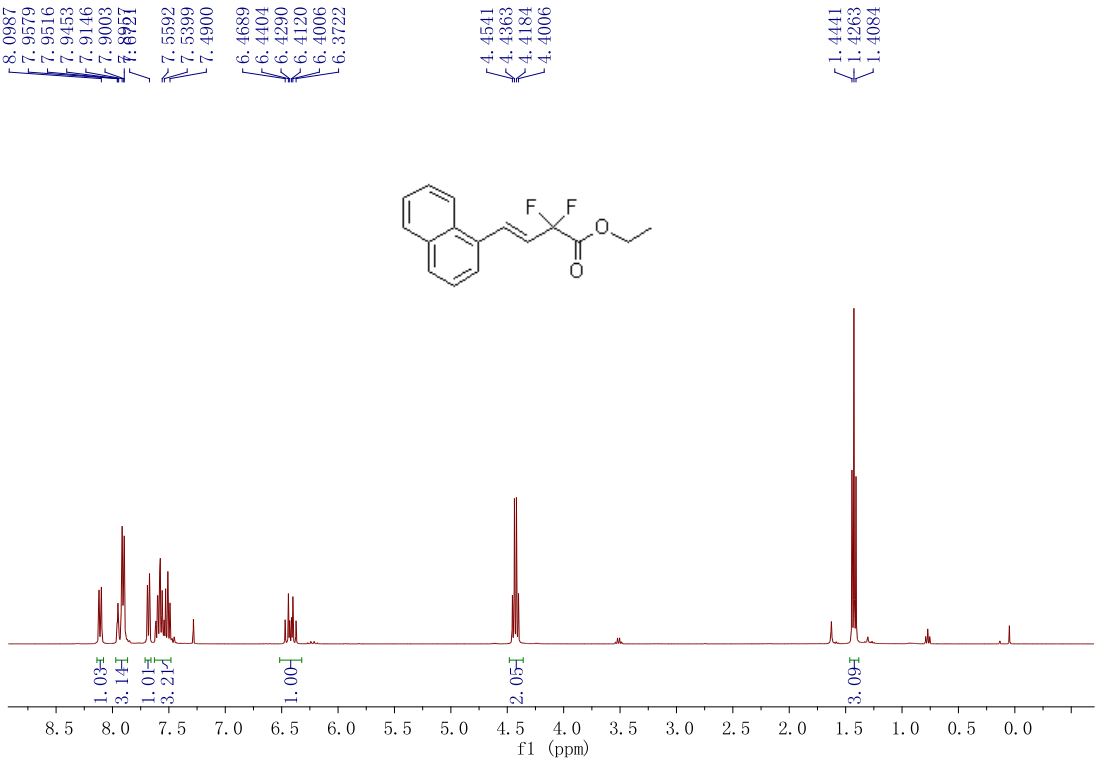

164.30
163.96
163.61
153.47
139.53
136.92
136.83
136.73
129.67
118.16
117.91
115.21
112.74
110.27
104.67
63.14
60.92
56.17
13.94
F
F
H3CO
H3CO
OCH3
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-102.96
F
F
H3CO
H3CO
OCH3
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


7.4897
7.4843
7.4685
7.4631
7.4472
7.1328
6.8475
6.4366
6.4085
6.3957
6.3804
6.3676
6.3396
4.4059
4.3880
4.3701
4.3523
1.4067
1.3888
1.3709
F
F
F
F
O
O
1.06
1.01
2.02
1.00
2.03
3.09
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


163.72
163.37
162.48
162.36
162.32
162.20
159.94
159.82
129.76
129.72
129.67
129.62
128.90
128.81
120.81
118.47
112.05
109.98
104.79
104.54
104.28
63.22
13.93
F
F
F
F
O
O
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


-103.73
-107.08
-107.11
-111.20
-111.22
F
F
F
F
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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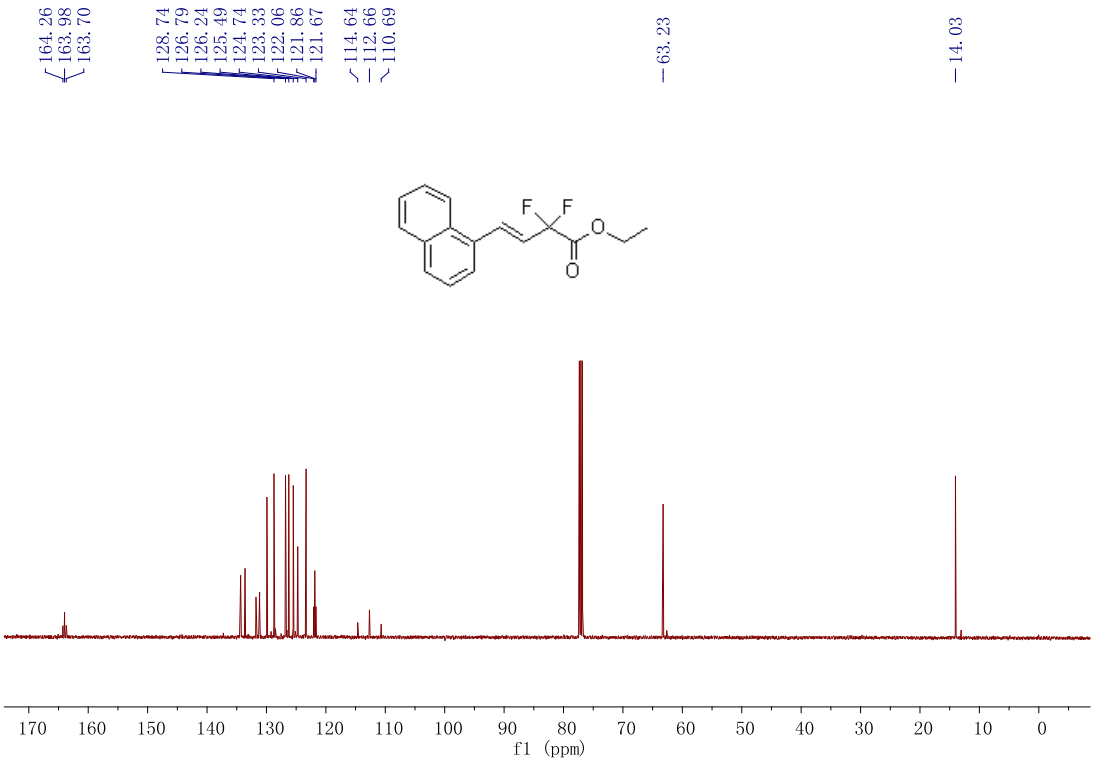
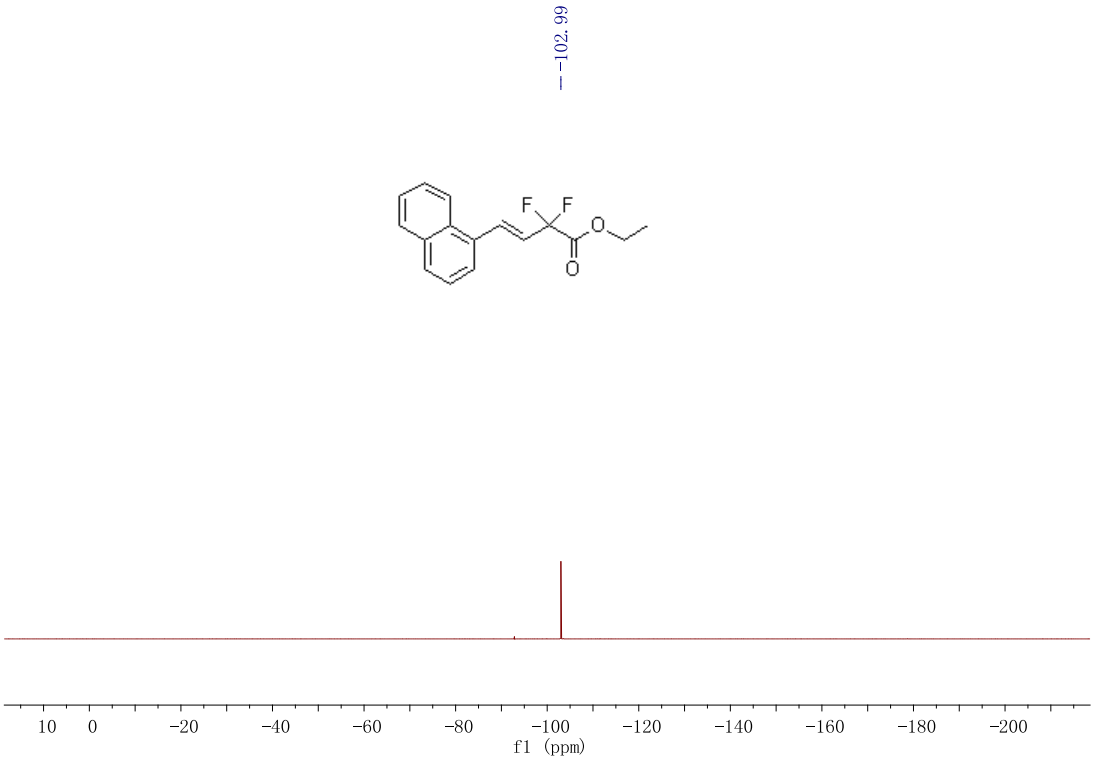
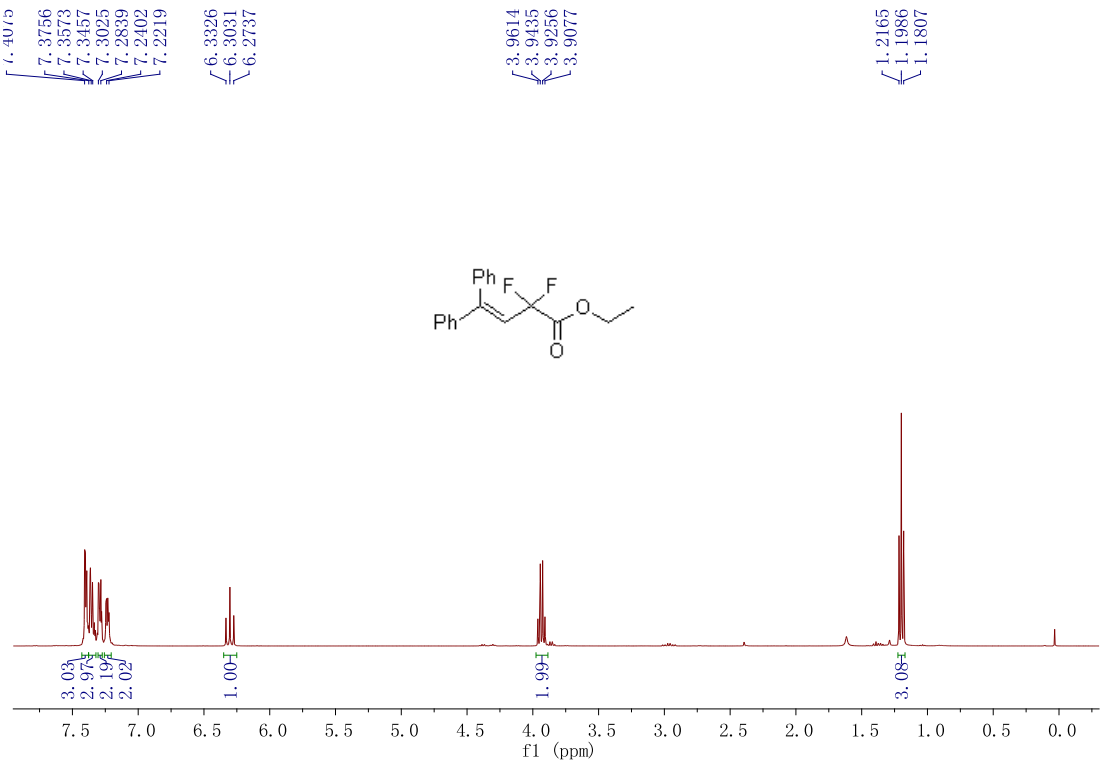
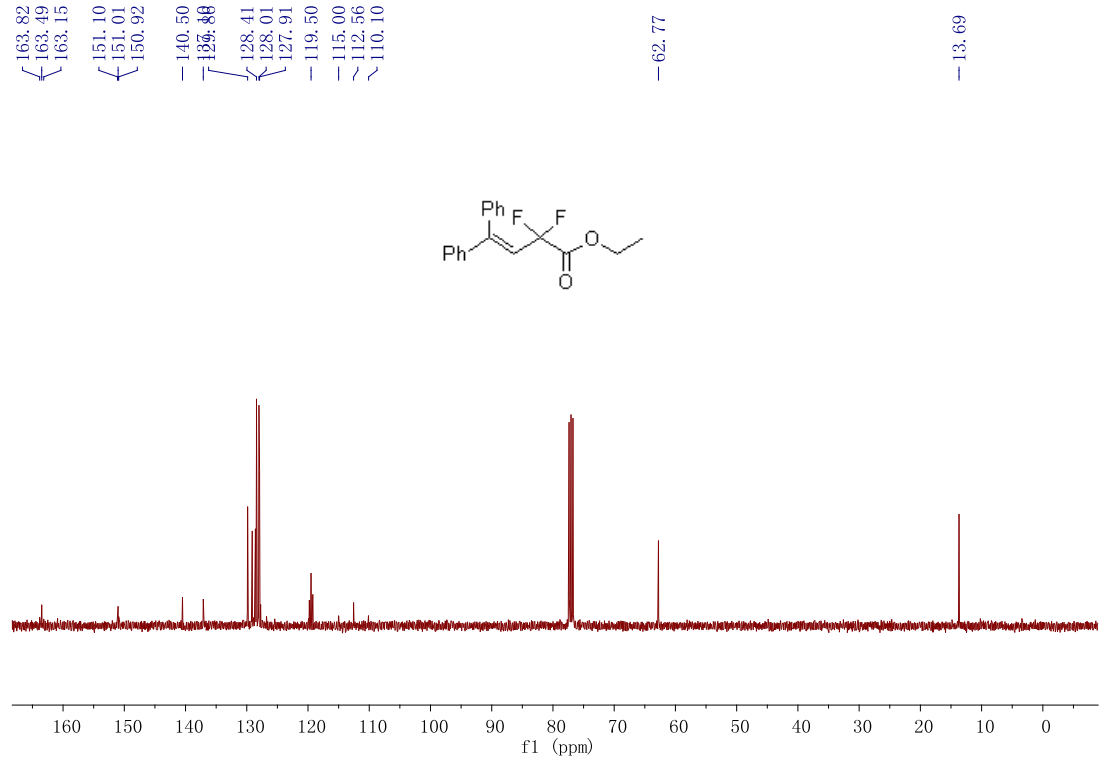
7.9516
7.9453
7.9146
7.9003
7.5592
7.5399
7.4900
6.4689
6.4404
6.4290
6.4120
6.4006
6.3722
4.4541
4.4363
4.4184
4.4006
1.4441
1.4263
1.4084
F
F
O
O
1.03
3.14
1.01
3.21
1.00
2.05
3.09
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


164.26
163.98
163.70
128.74
126.79
126.24
125.49
124.74
123.33
122.06
121.86
121.67
114.64
112.66
110.69
63.23
14.03
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-102.99
F
F
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


7.4075
7.3756
7.3573
7.3457
7.3025
7.2839
7.2402
7.2219
6.3326
6.3031
6.2737
3.9614
3.9435
3.9256
3.9077
1.2165
1.1986
1.1807
Ph
F
F
Ph
O
O
3.03
2.97
2.19
2.02
1.00
1.99
3.08
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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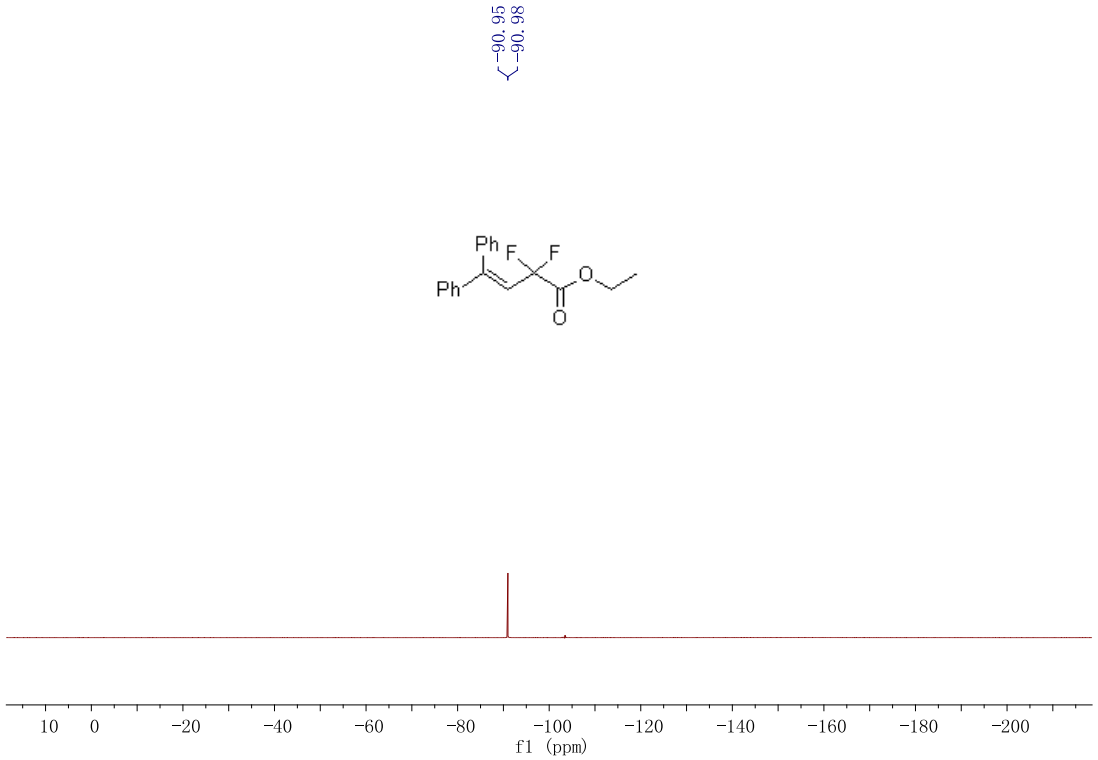
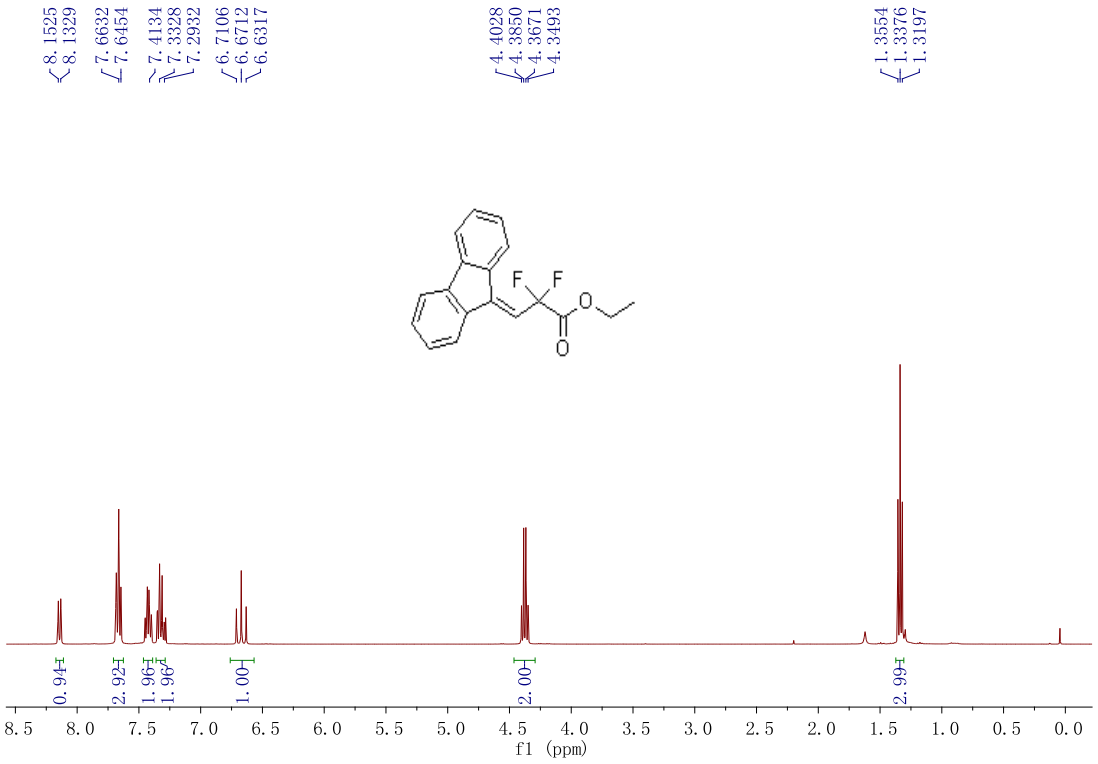
163.15
151.10
151.01
150.92
140.50
128.41
128.01
127.91
119.50
115.00
112.56
110.10
62.77
13.69
Ph
F
F
Ph
O
O
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-90.95
-90.98
Ph
F
F
Ph
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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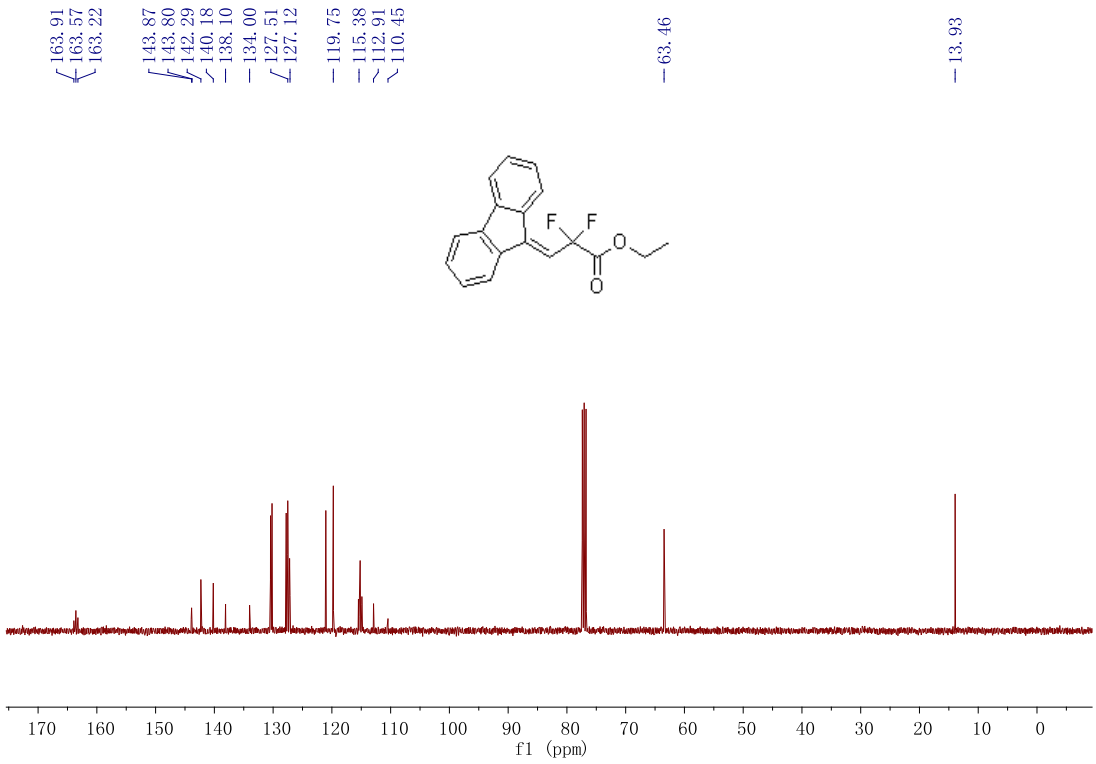
8.1329
7.6632
7.6454
7.4134
7.3328
7.2932
6.7106
6.6712
6.6317
4.4028
4.3850
4.3671
4.3493
1.3554
1.3376
1.3197
F
F
O
O
0.94
2.92
1.96
1.96
1.00
2.00
2.99
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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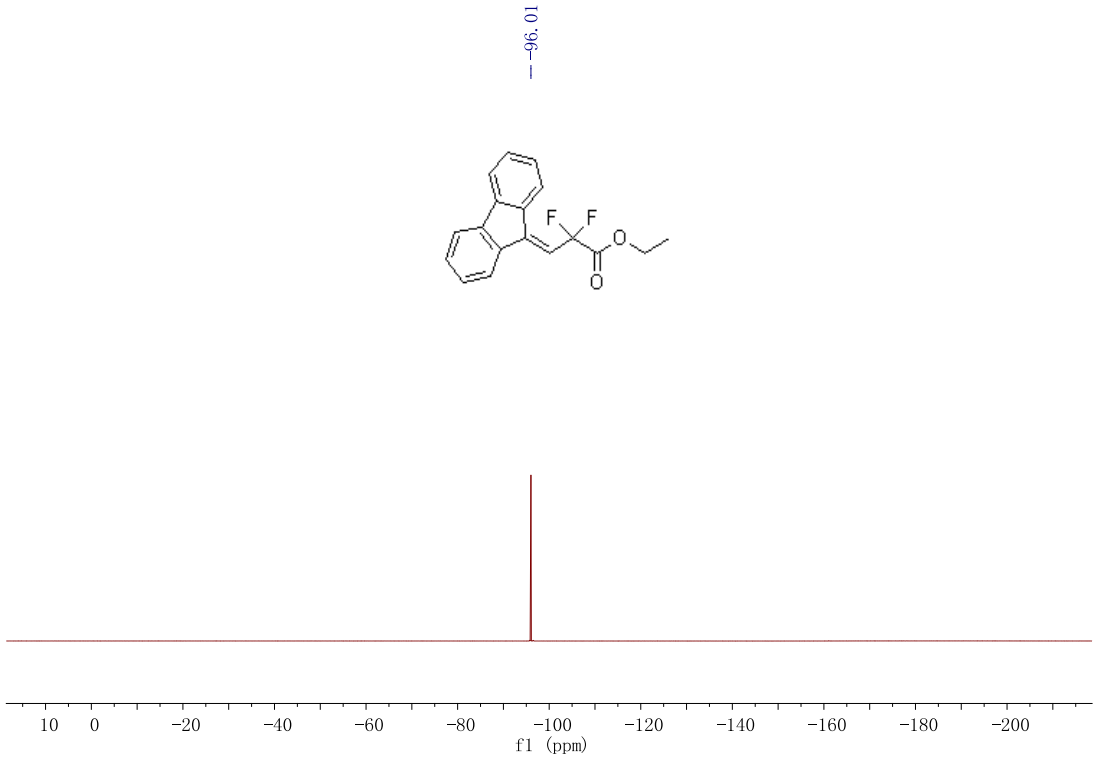
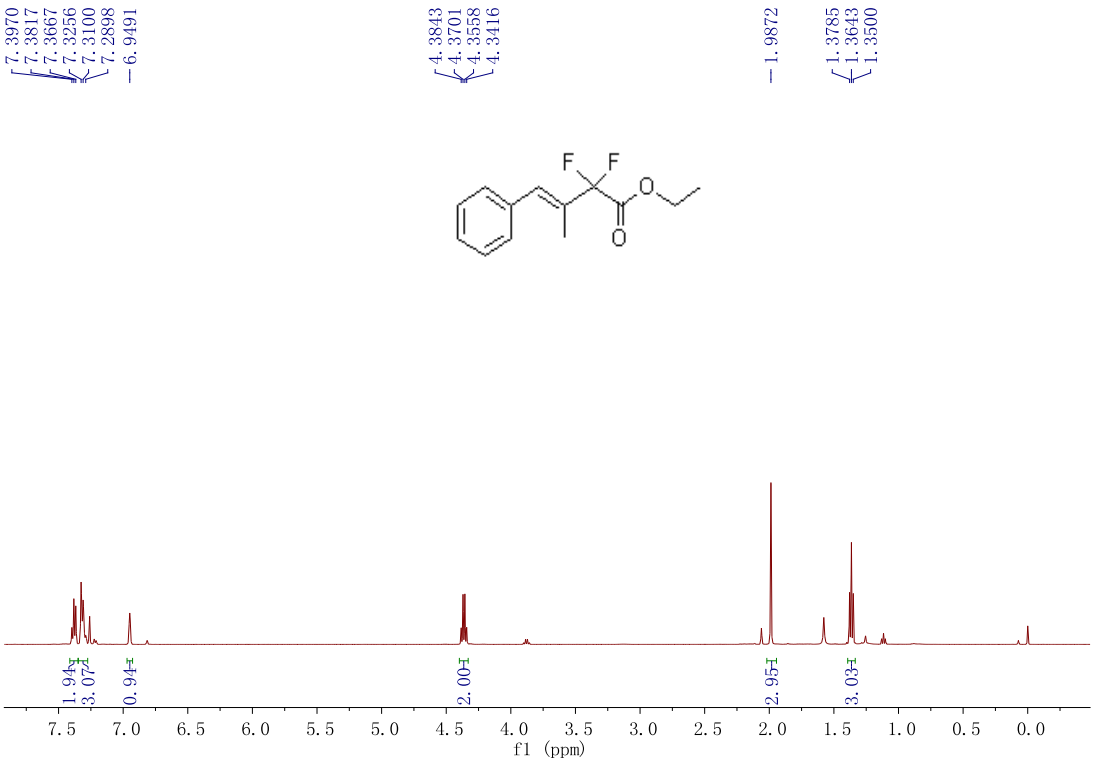
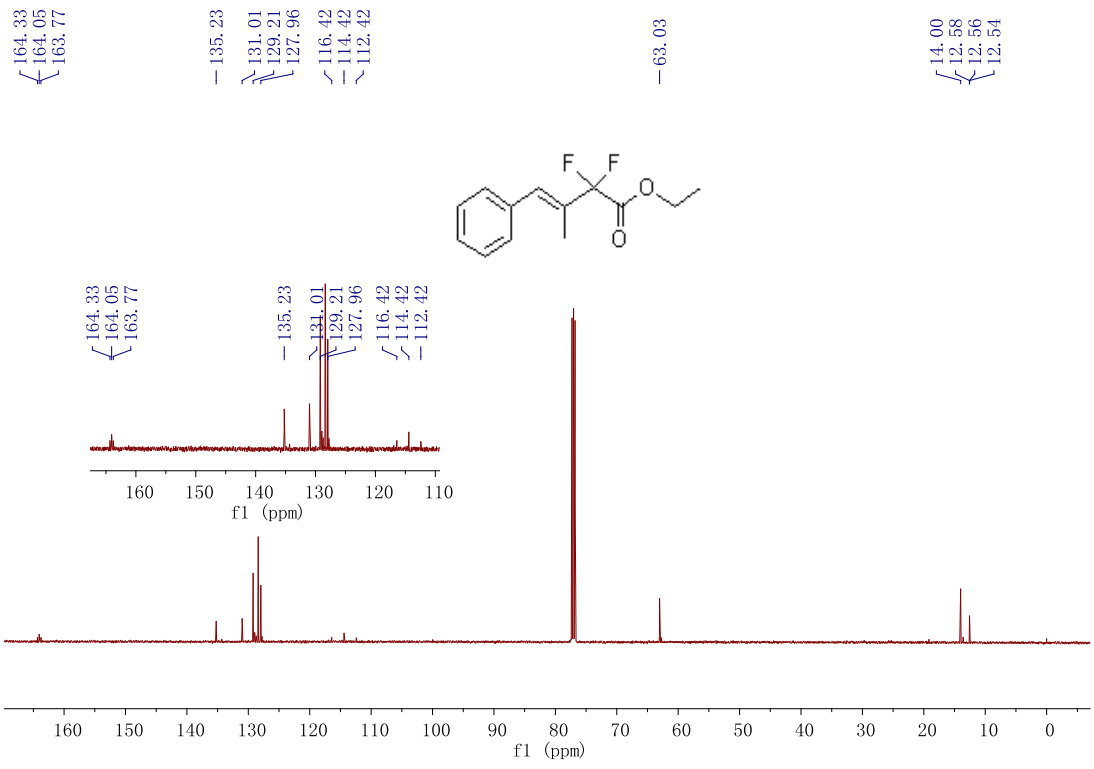
142.29
140.18
138.10
134.00
127.51
127.12
119.75
115.38
112.91
110.45
63.46
13.93
F
F
O
O
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-96.01
F
F
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


7.3970
7.3817
7.3667
7.3256
7.3100
7.2898
6.9491
4.3843
4.3701
4.3558
4.3416
1.9872
1.3785
1.3643
1.3500
F
F
O
O
1.94
3.07
0.94
2.00
2.95
3.03
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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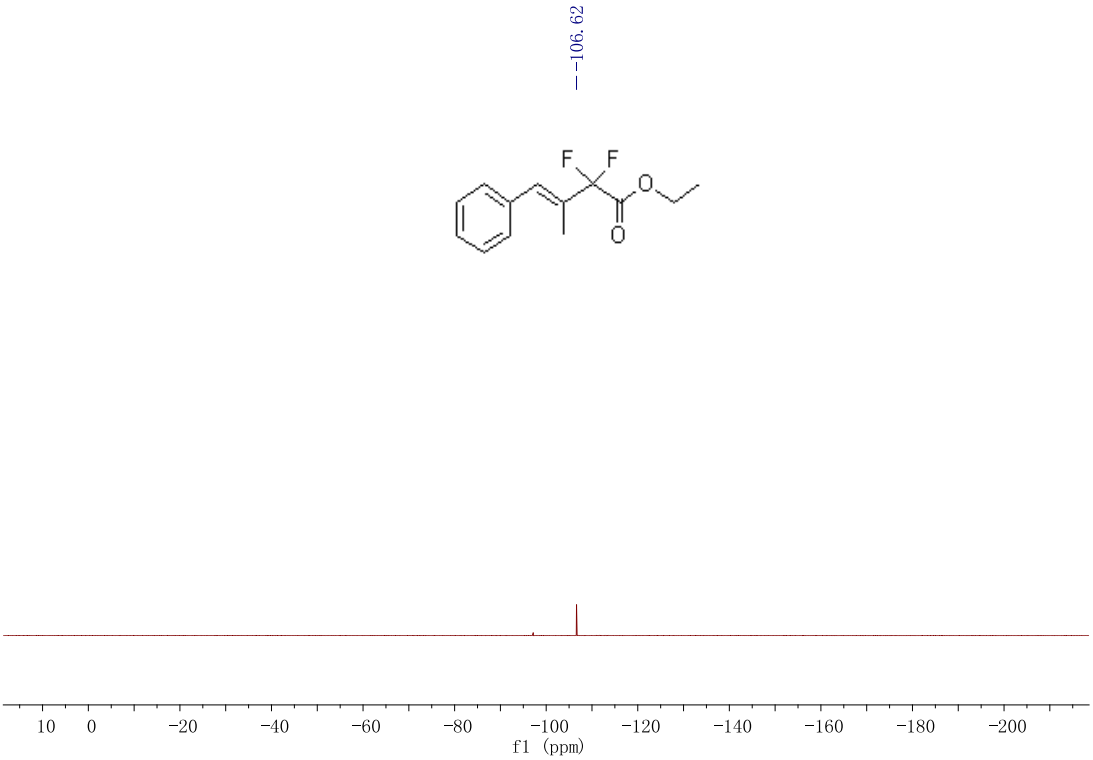
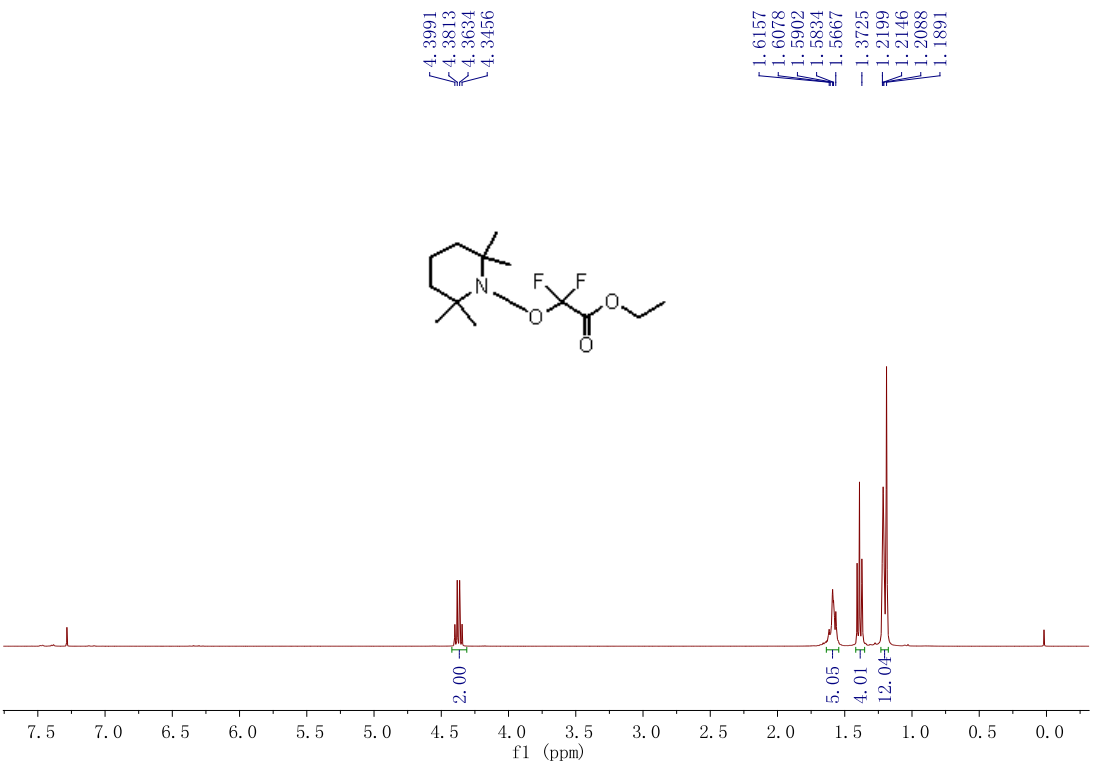
164.05
163.77
135.23
131.01
129.21
127.96
116.42
114.42
112.42
63.03
14.00
12.58
12.56
12.54
F
F
O
O
160 150 140 130 120 110
f1 (ppm)
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-106.62
F
F
O
O
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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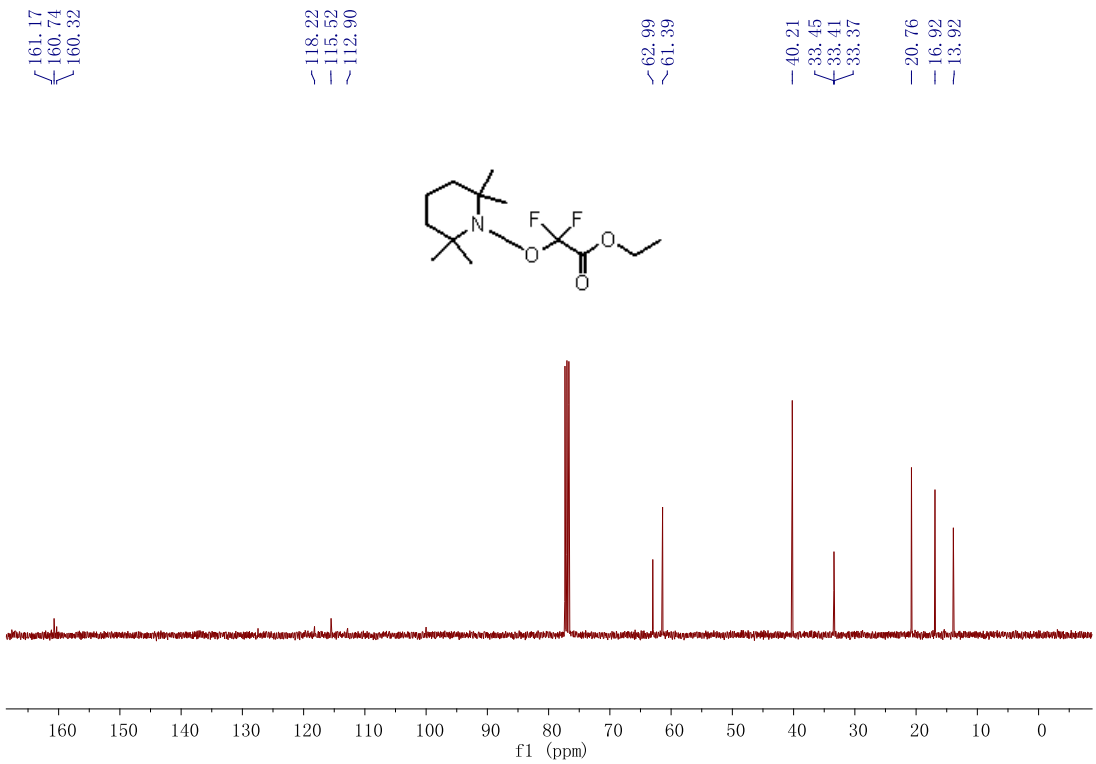
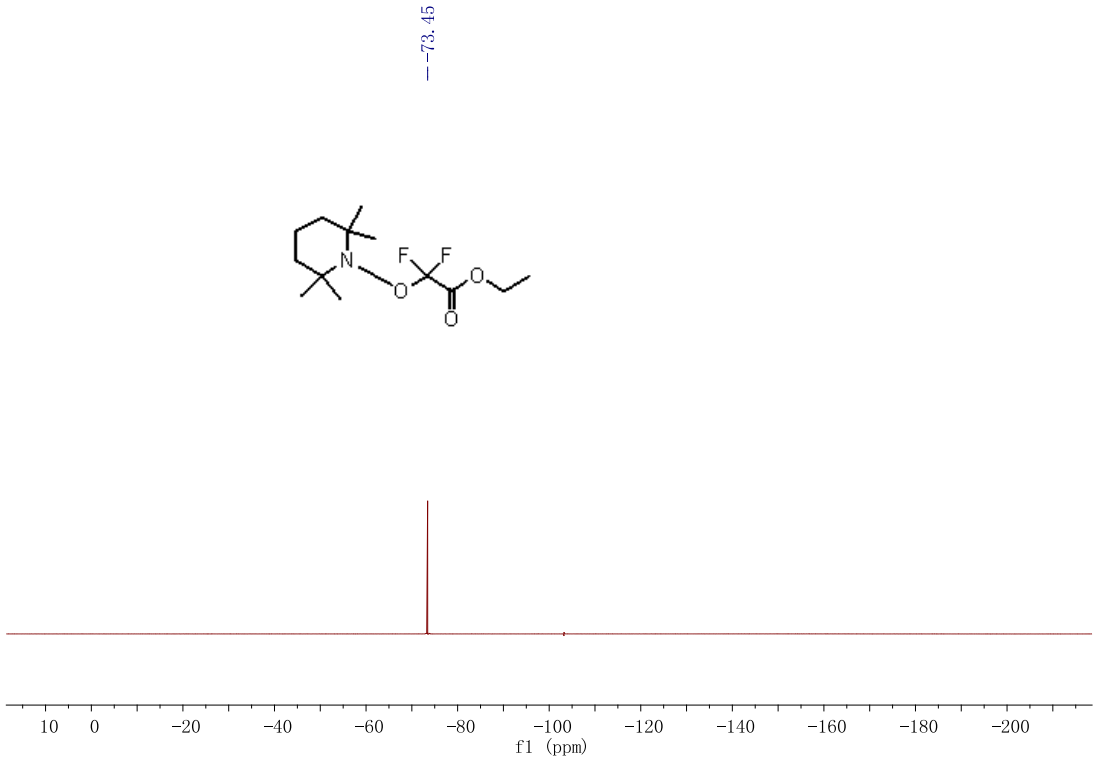
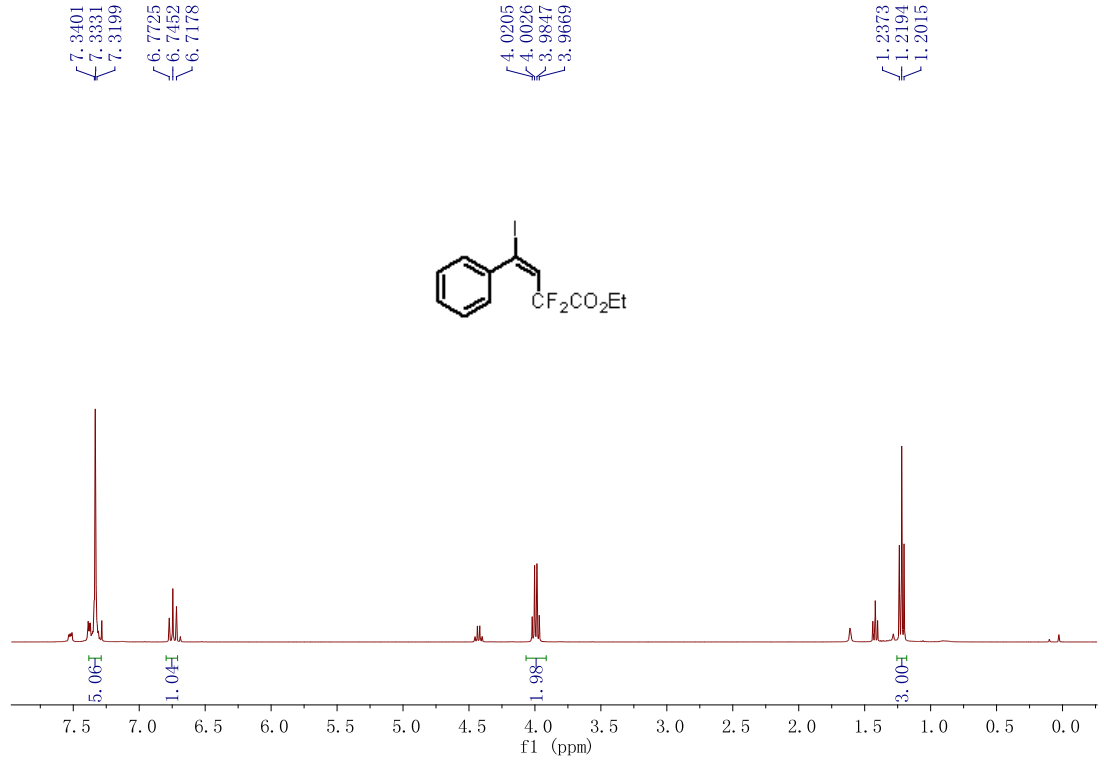
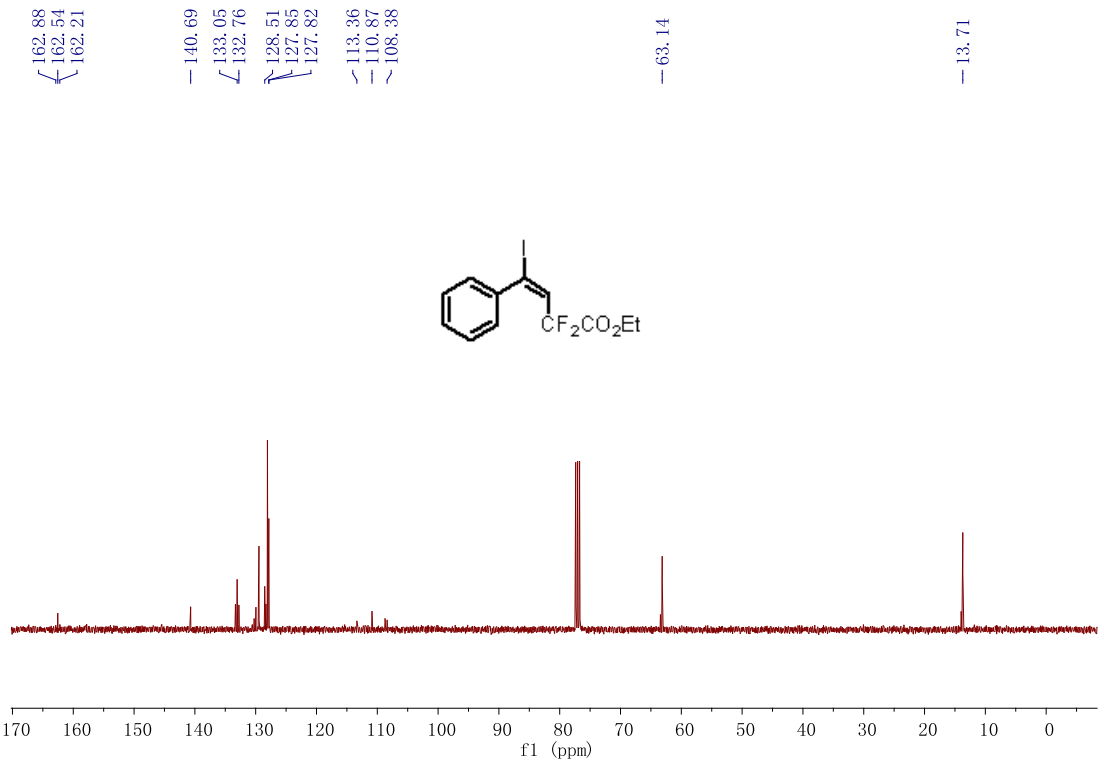
4.3813
4.3634
4.3456
1.6157
1.6078
1.5902
1.5834
1.5667
1.3725
1.2199
1.2146
1.2088
1.1891
N
F
F
O
O
O
2.00
5.05
4.01
12.04
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


161.17
160.74
160.32
118.22
115.52
112.90
62.99
61.39
40.21
33.45
33.41
33.37
20.76
16.92
13.92
F
F
N
O
O
O
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-73.45
F
F
N
O
O
O
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


7.3401
7.3331
7.3199
6.7725
6.7452
6.7178
4.0205
4.0026
3.9847
3.9669
1.2373
1.2194
1.2015
I
CF2CO2Et
5.06
1.04
1.98
3.00
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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127.85
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63.14
13.71
I
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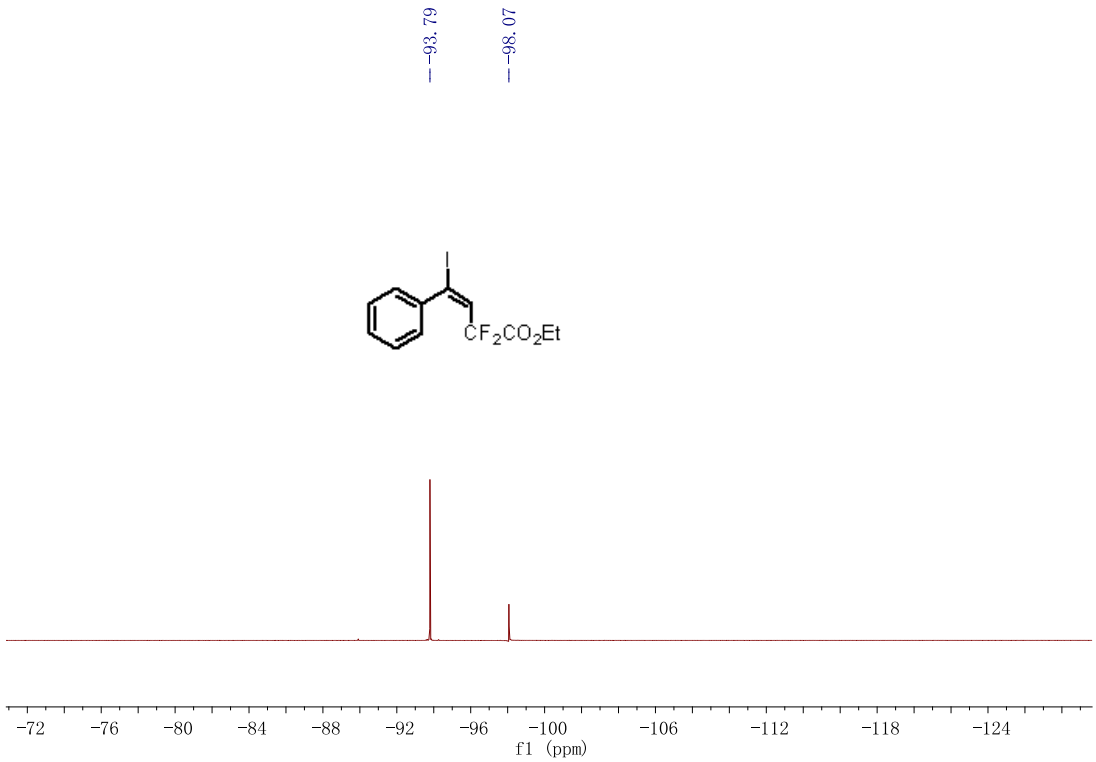
f1 (ppm)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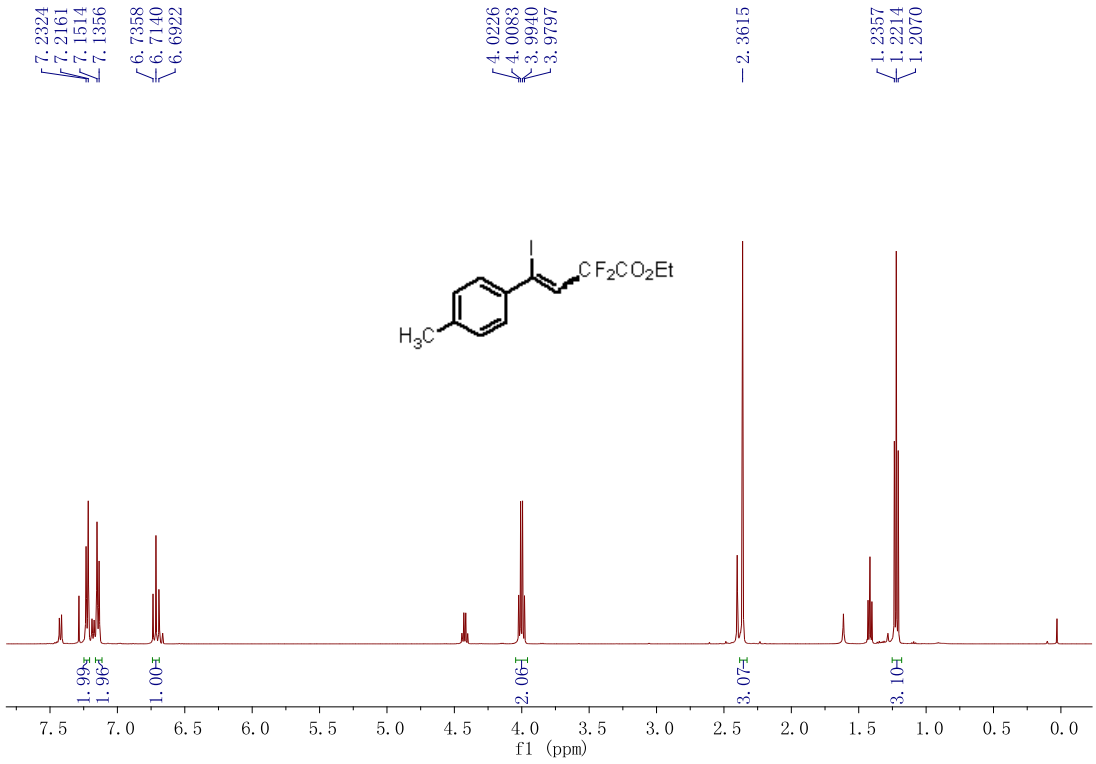
-96
-100
-106
-112
-118
-124
f1 (ppm)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3.9797
2.3615
1.2357
1.2214
1.2070
I
CF2CO2Et
H3C
1.99
1.96
1.00
2.06
3.07
3.10
7.5
7.0
6.5
6.0
5.5
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4.5
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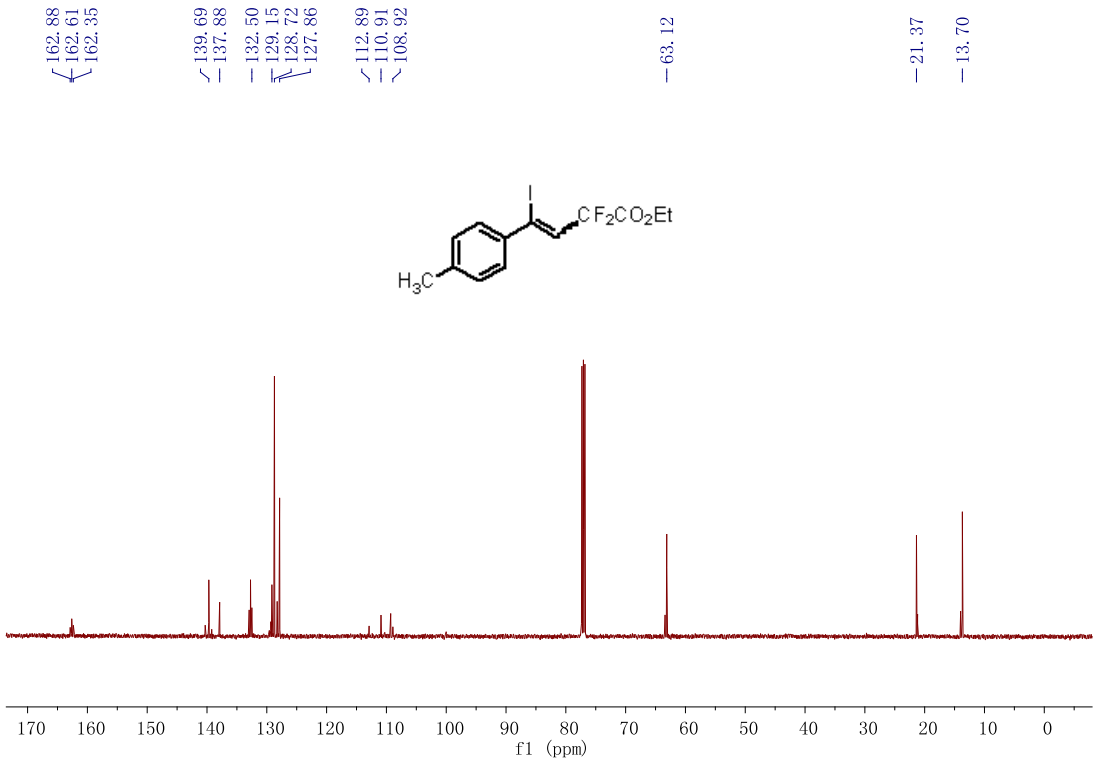
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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CF2CO2Et
H3C
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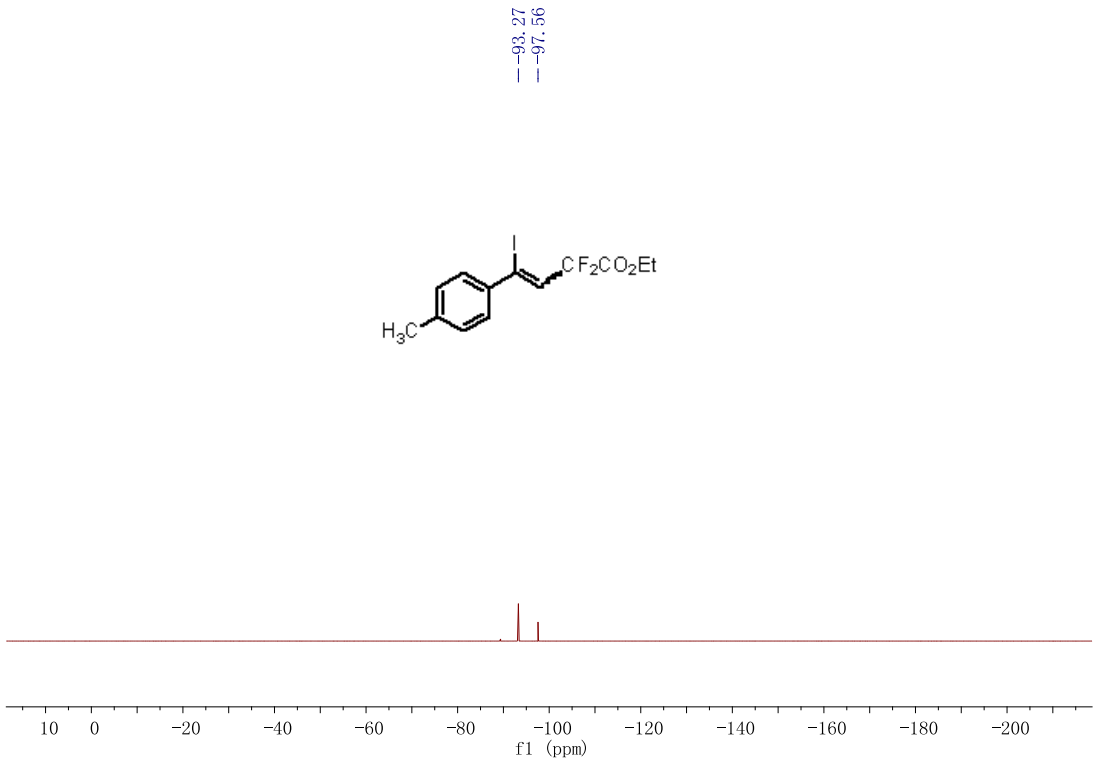
f1 (ppm)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H3C
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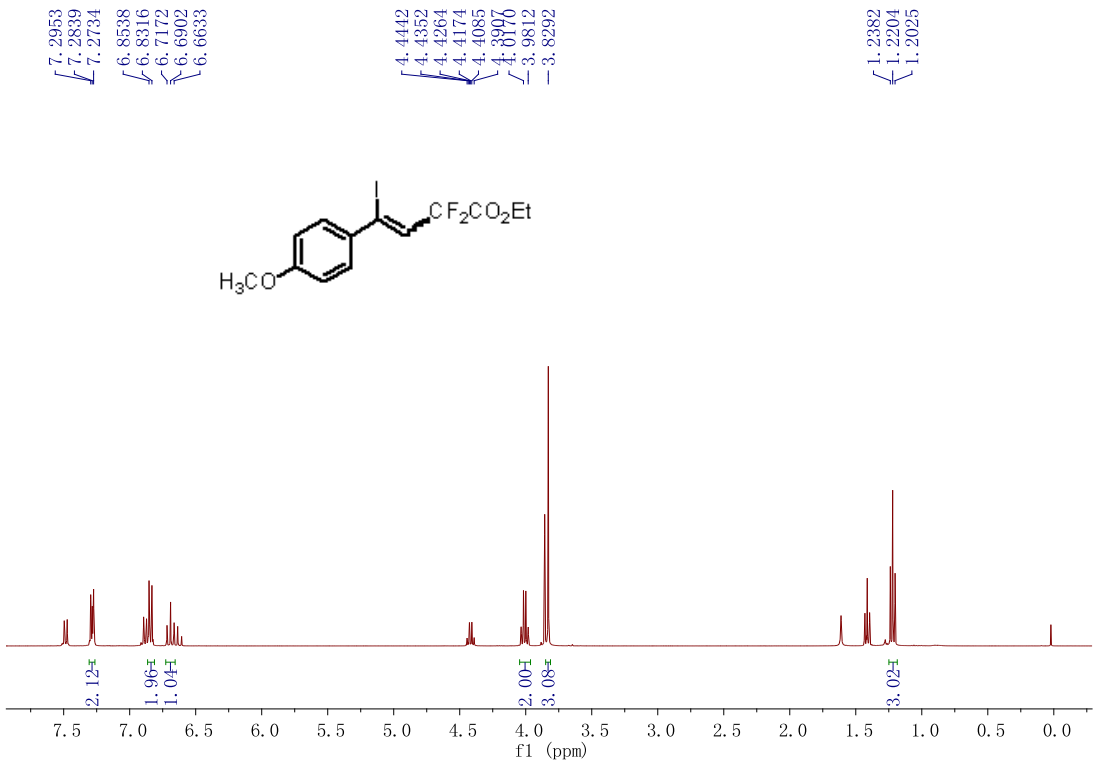
f1 (ppm)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6.6902
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4.4352
4.4264
4.4174
4.4085
4.3907
4.3870
3.9812
3.8292
1.2382
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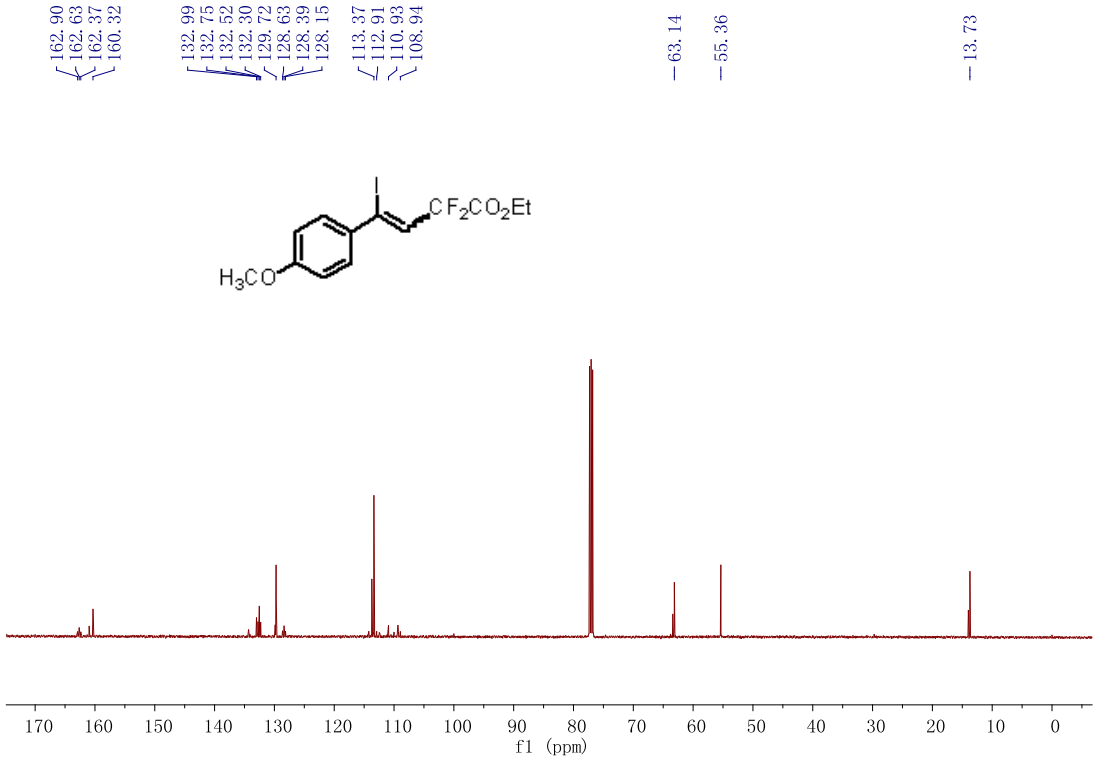
CF2CO2Et
H3CO
2.12
1.96
1.04
2.00
3.08
3.02
f1 (ppm)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110.93
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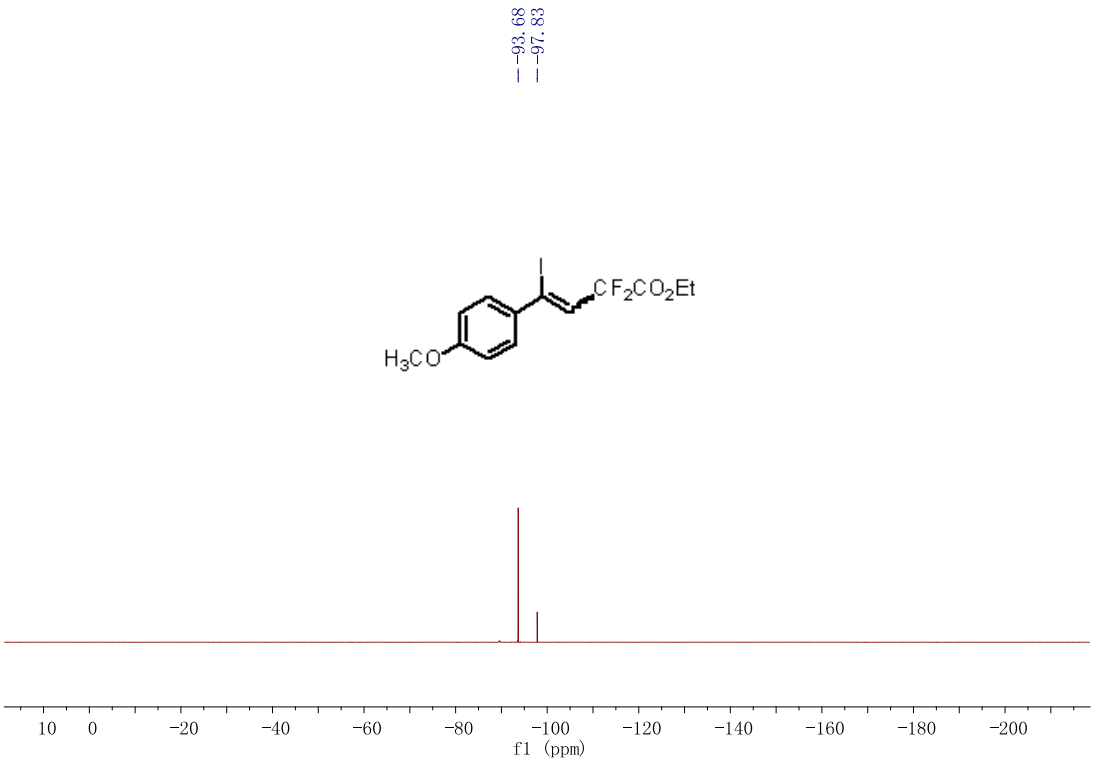
13.73
CF2CO2Et
H3CO
f1 (ppm)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-180
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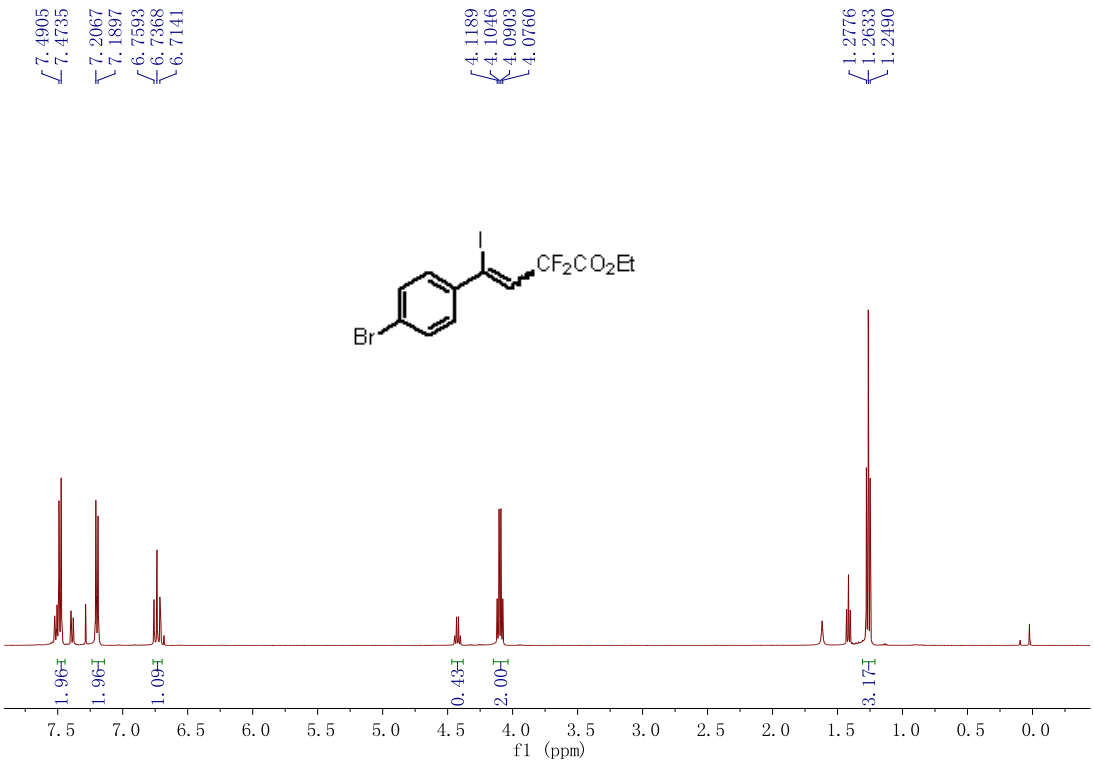
f1 (ppm)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6.7593
6.7368
6.7141
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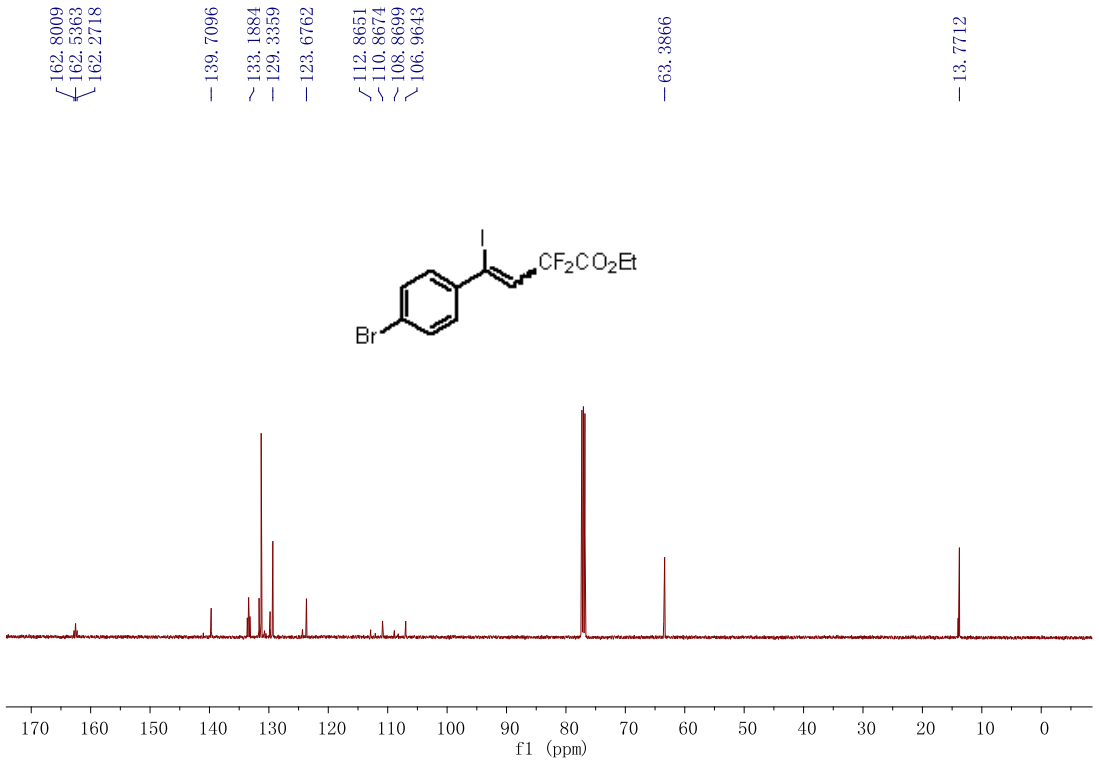
4.1046
4.0903
4.0760
1.2776
1.2633
1.2490
I
CF2CO2Et
Br
1.96
1.96
1.09
0.43
2.00
3.17
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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123.6762
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13.7712
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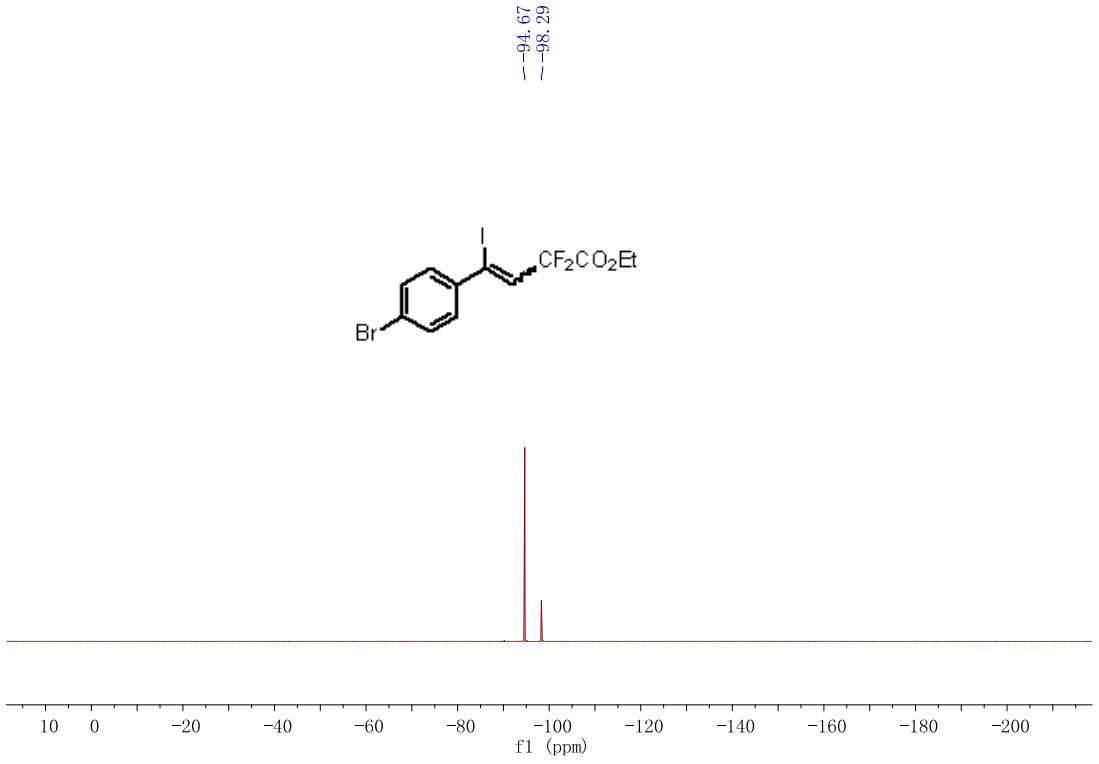
CF2CO2Et
Br
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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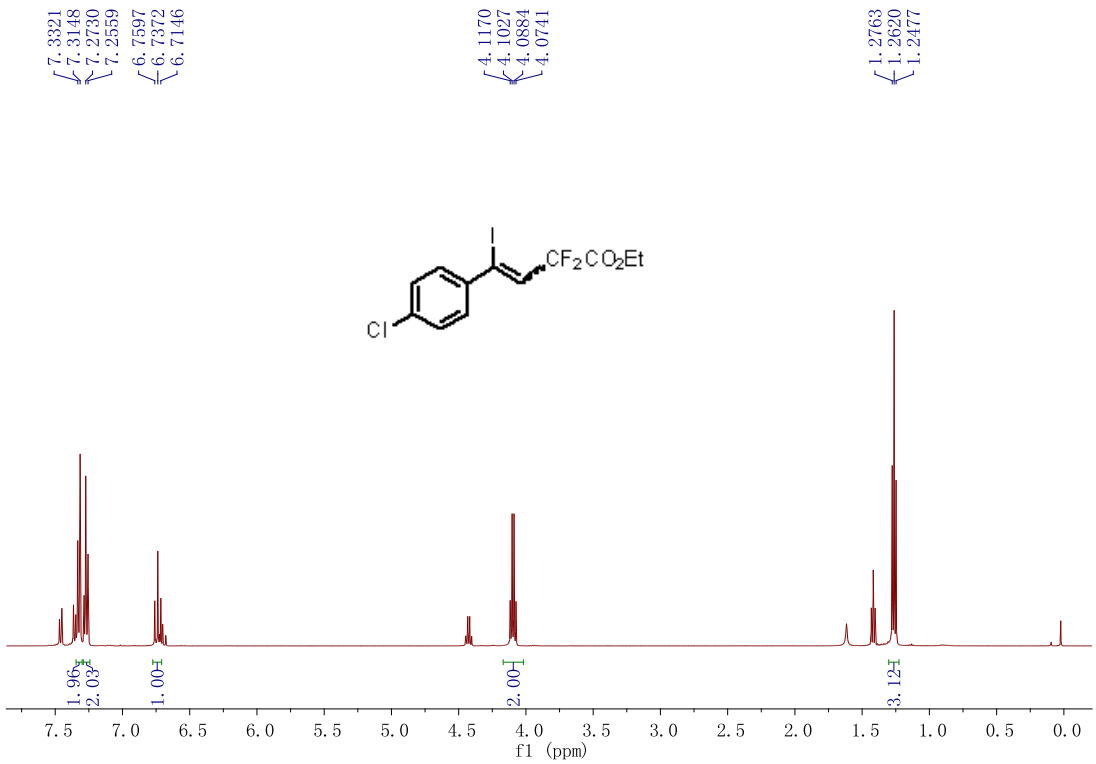
f1 (ppm)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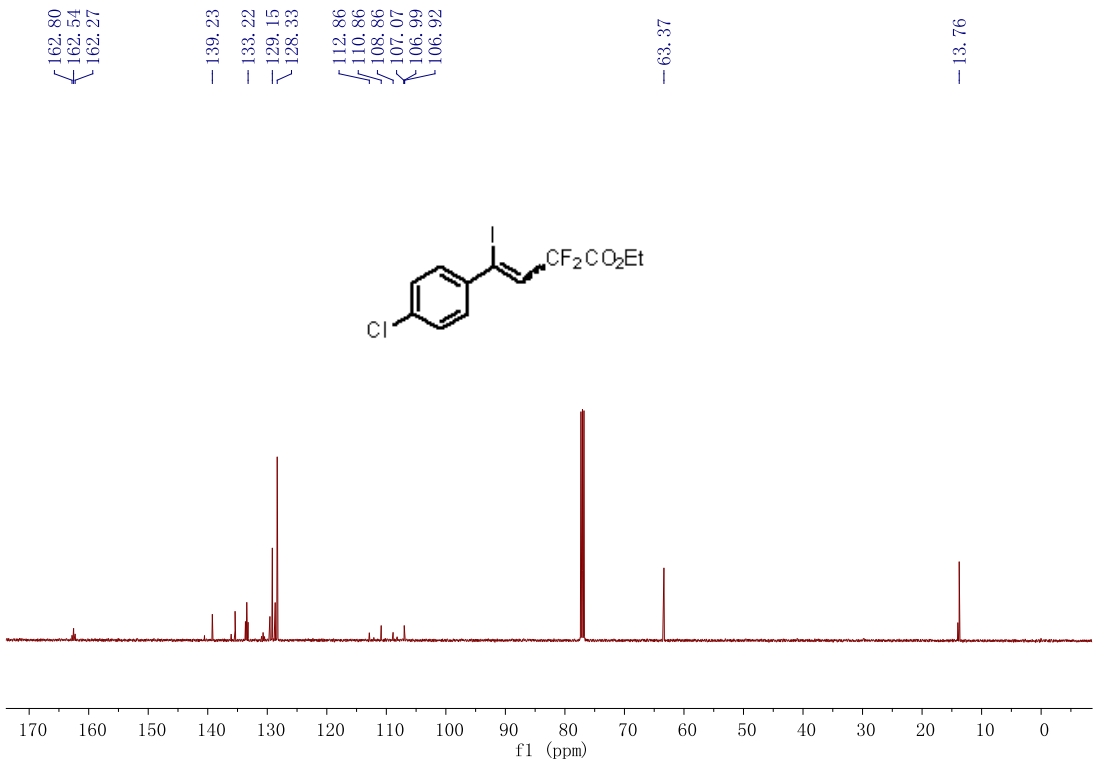
4.1027
4.0884
4.0741
1.2763
1.2620
1.2477
CF2CO2Et
Cl
1.96
2.03
1.00
2.00
3.12
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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110.86
108.86
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63.37
13.76
CF2CO2Et
Cl
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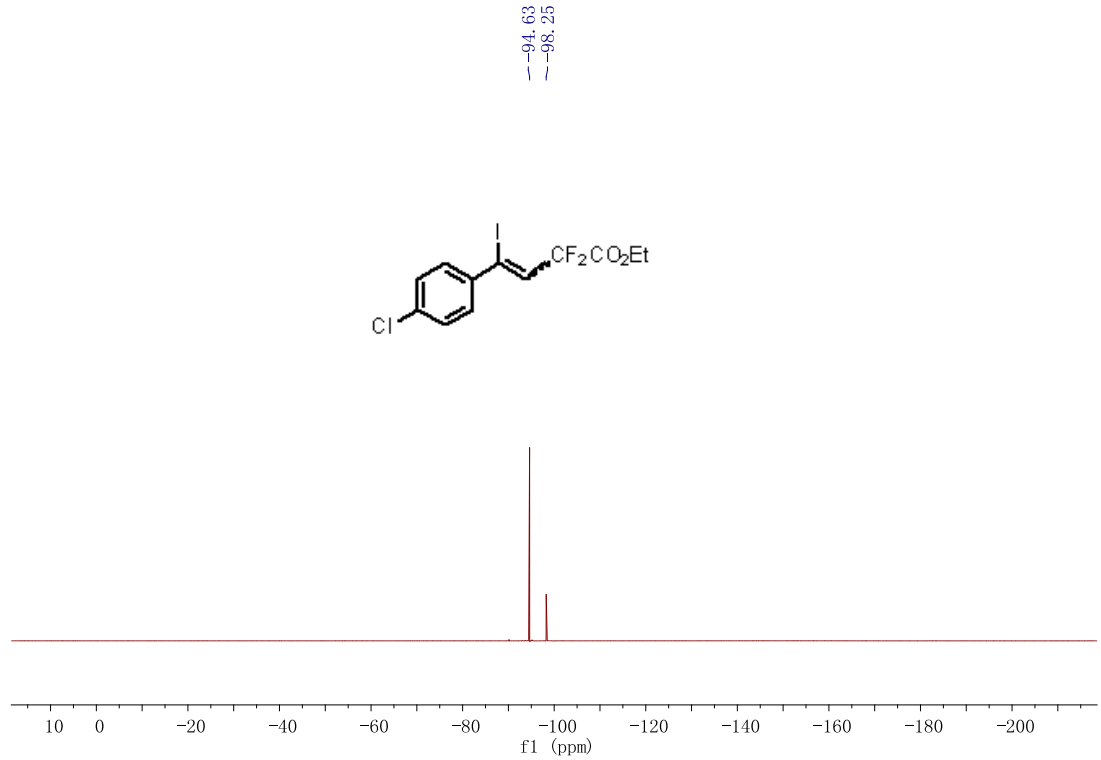
f1 (ppm)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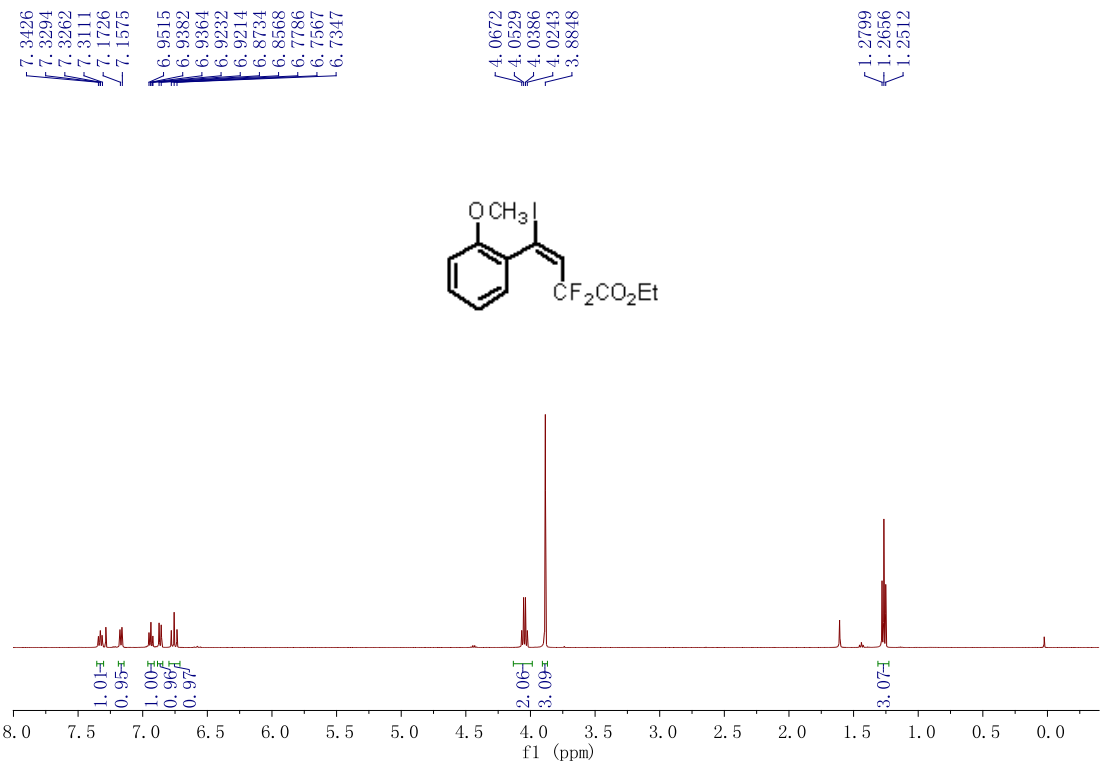
f1 (ppm)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6.9214
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6.8568
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6.7567
6.7347
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4.0529
4.0386
4.0243
3.8848
1.2799
1.2656
1.2512
OCH3
I
CF2CO2Et
1.01
0.95
1.00
0.96
0.97
2.06
3.09
3.07
8.0
7.5
7.0
6.5
6.0
5.5
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3.5
3.0
2.5
2.0
1.5
1.0
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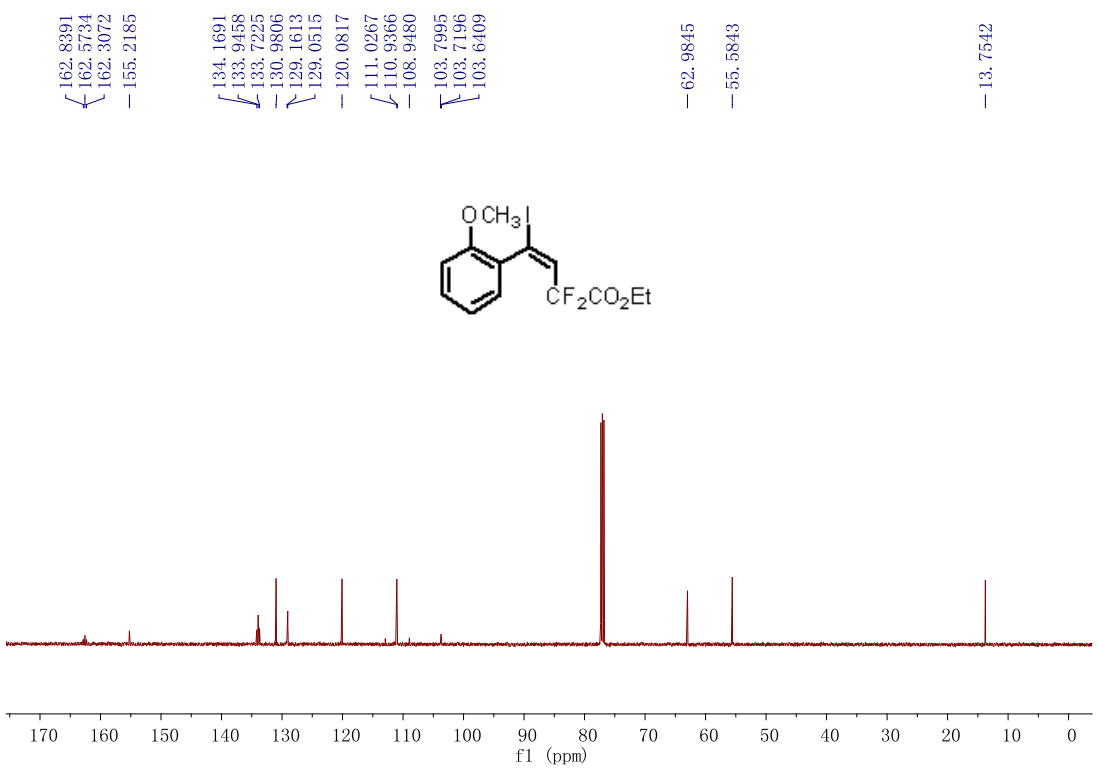
0.0
f1 (ppm)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103.7196
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OCH3
CF2CO2Et
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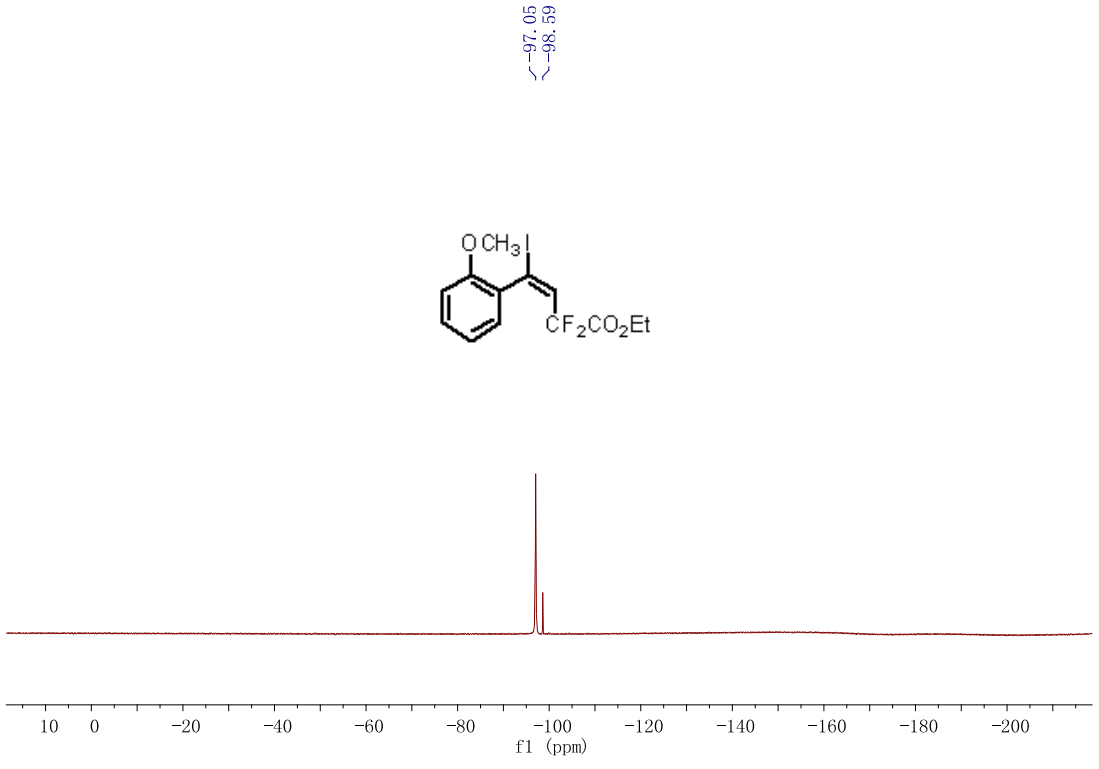
f1 (ppm)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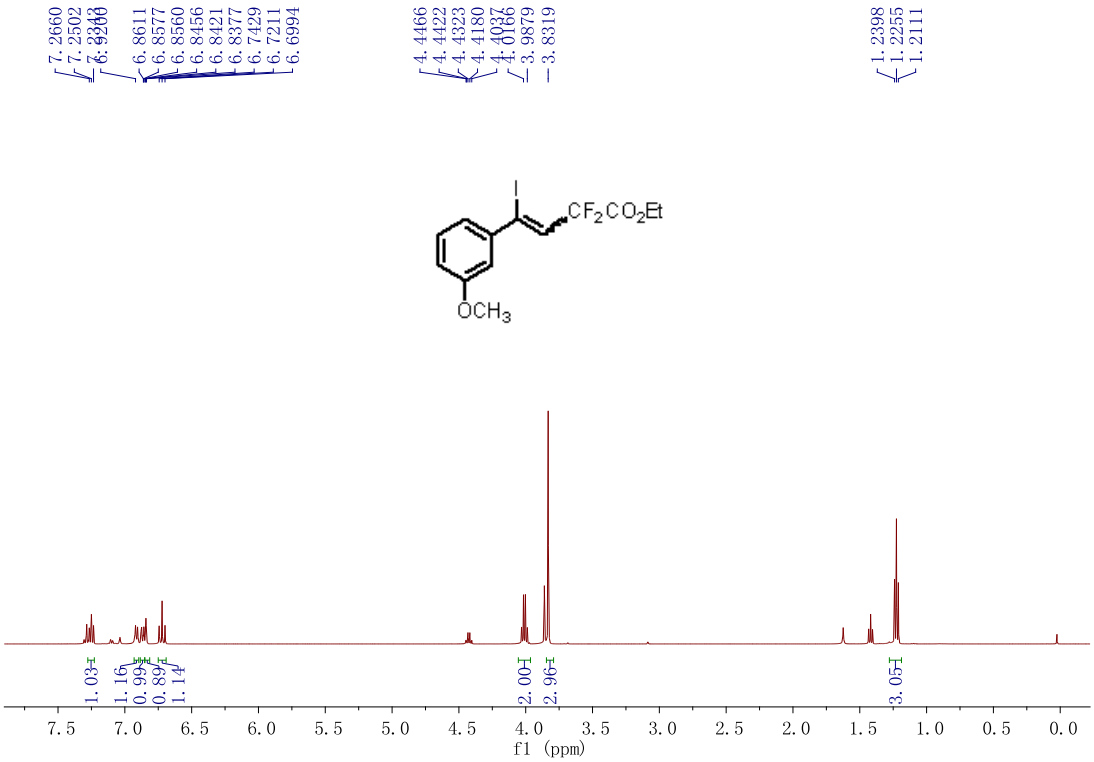
f1 (ppm)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6.6994
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3.8319
1.2398
1.2255
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I
CF2CO2Et
OCH3
1.03
1.16
0.99
0.89
1.14
2.00
2.96
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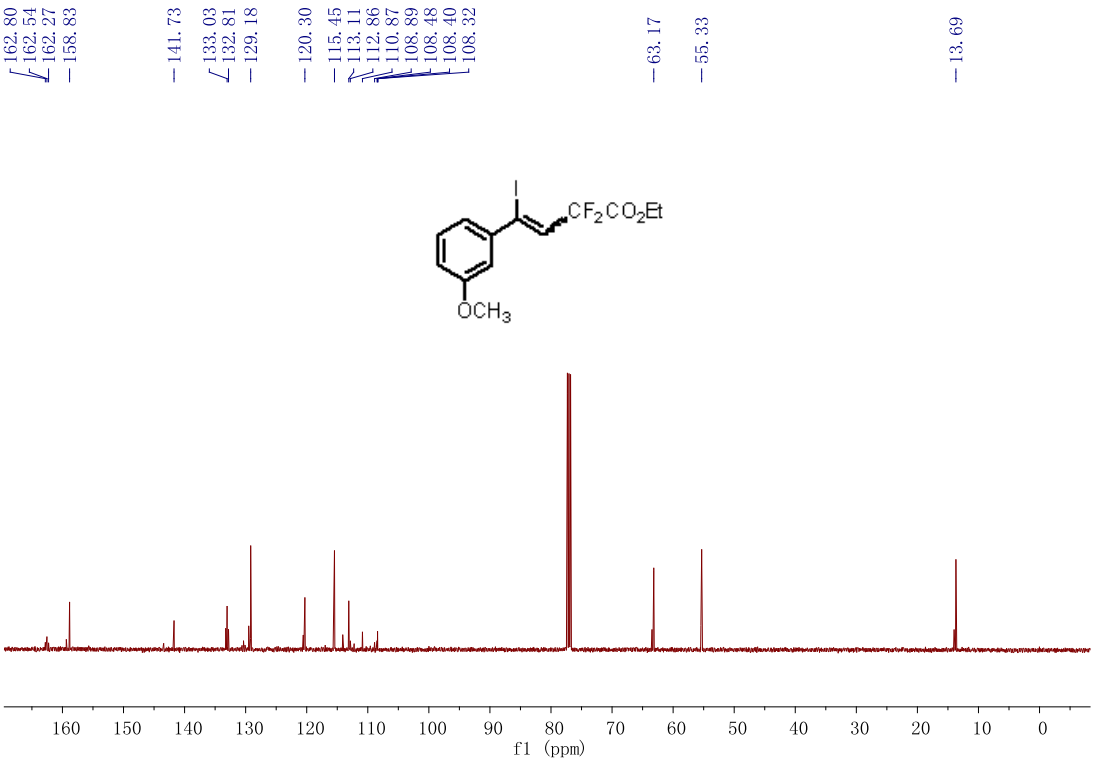
f1 (ppm)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113.11
112.86
110.87
108.89
108.48
108.40
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13.69
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OCH3
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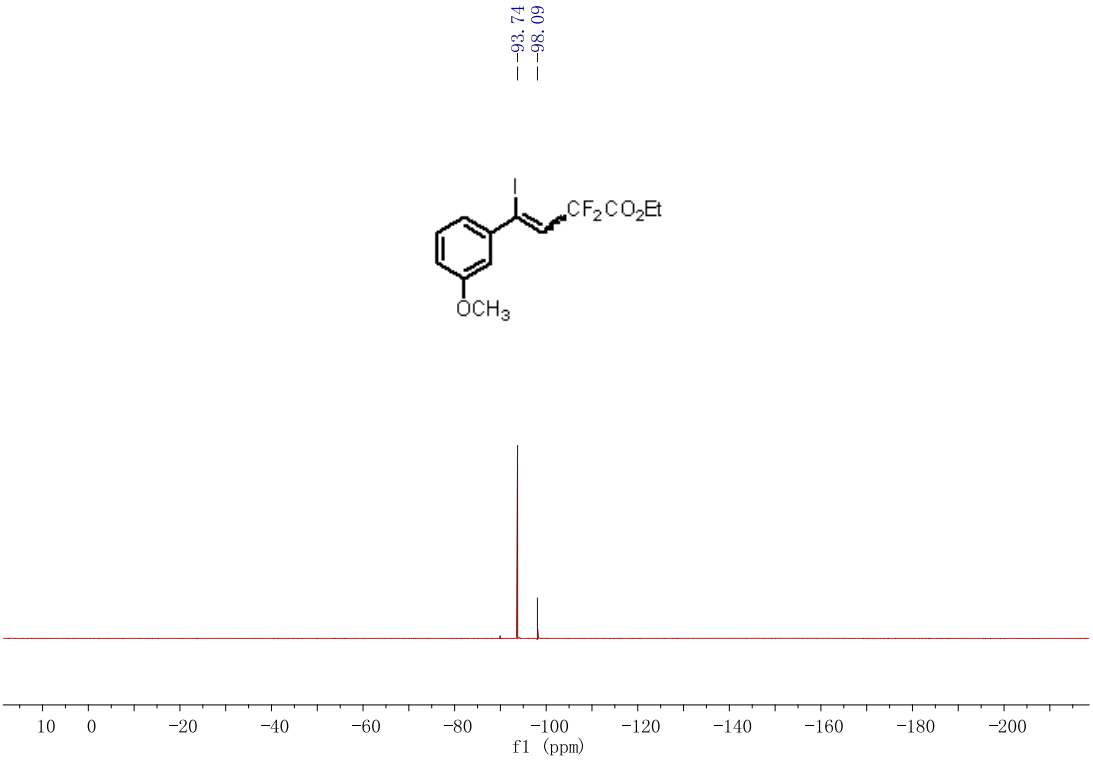
f1 (ppm)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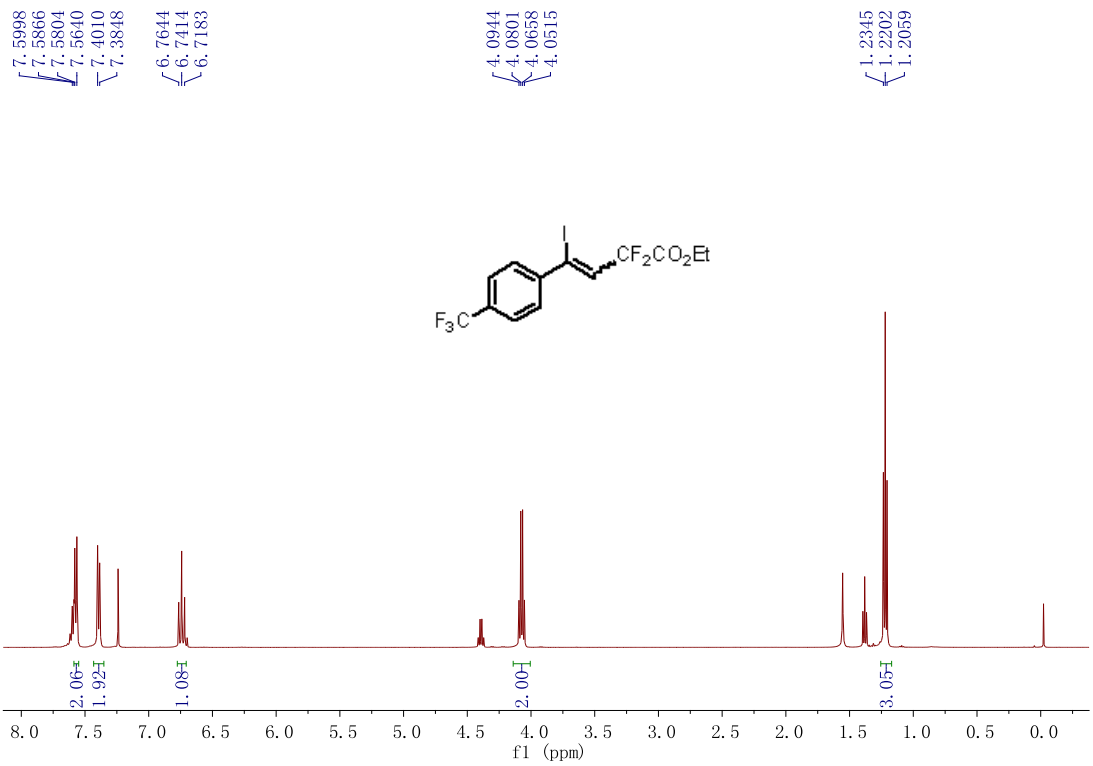
f1 (ppm)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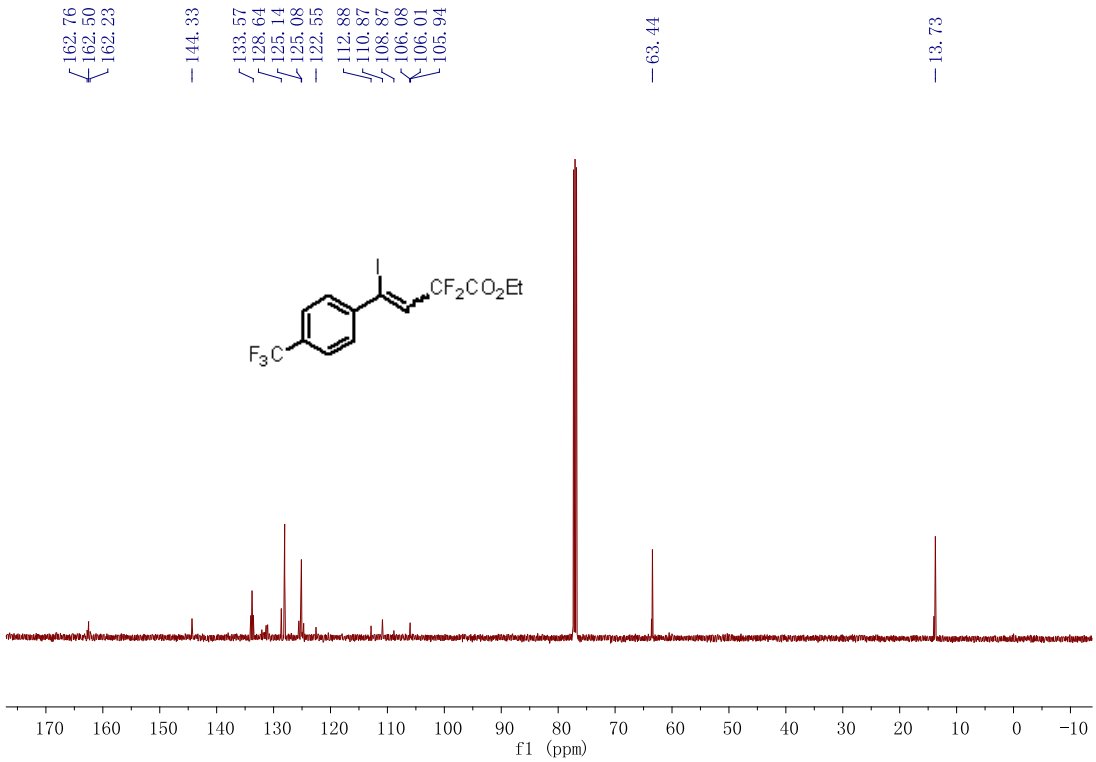
4.0515
1.2345
1.2202
1.2059
I
CF2CO2Et
F3C
2.06
1.92
1.08
2.00
3.05
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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106.01
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13.73
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CF2CO2Et
F3C
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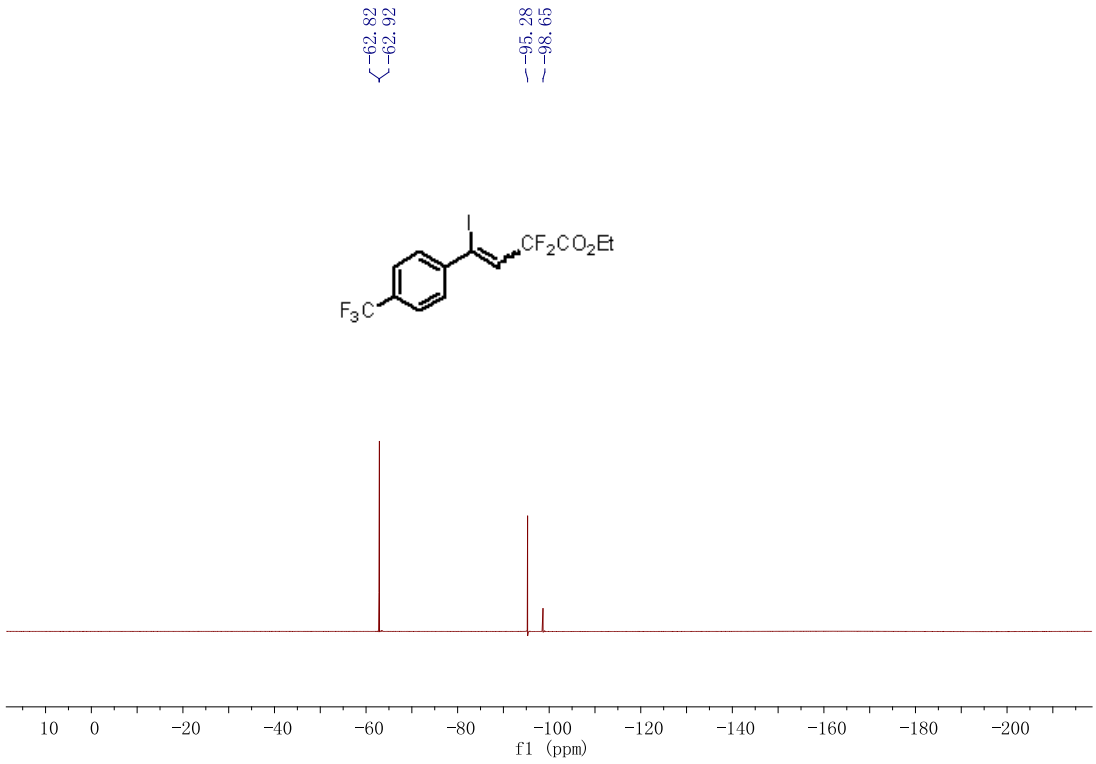
f1 (ppm)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F3C
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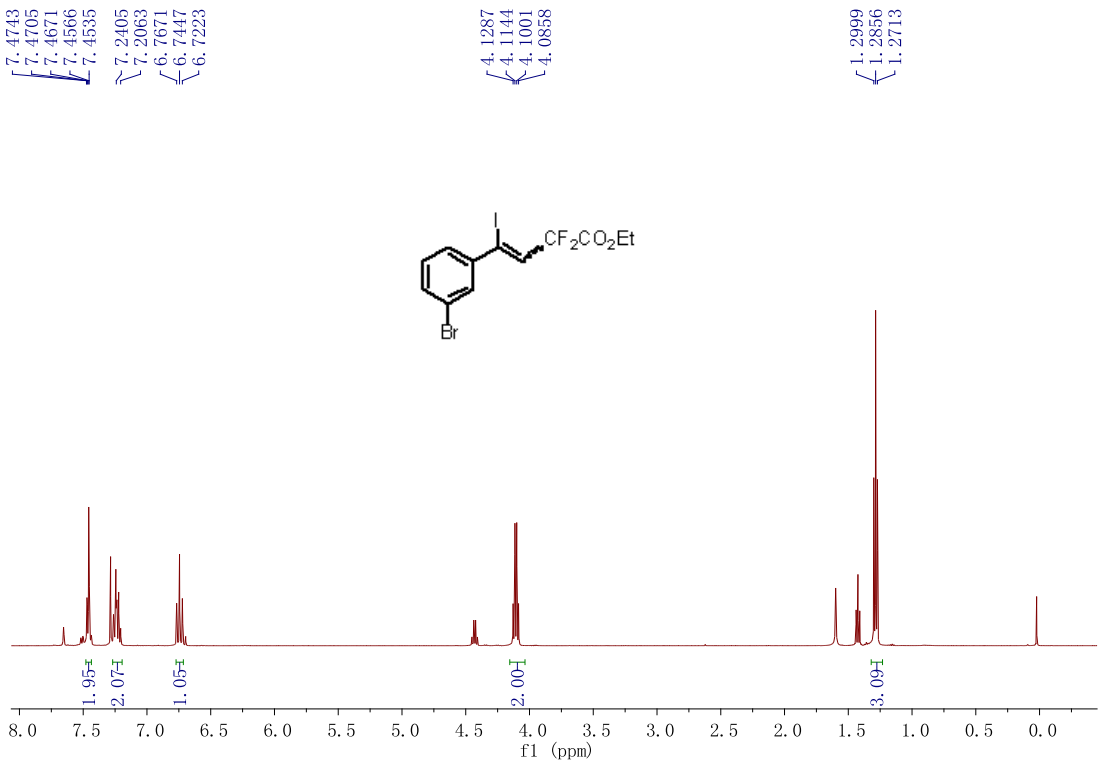
f1 (ppm)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4.1144
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1.2999
1.2856
1.2713
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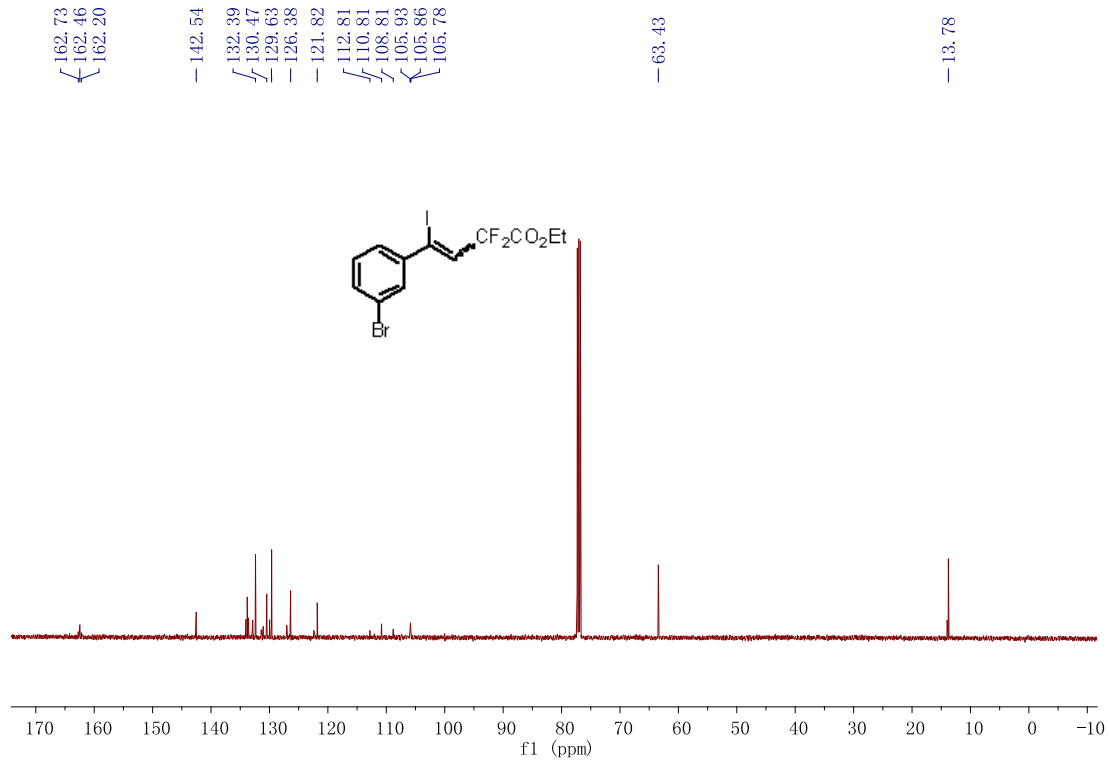
CF2CO2Et
Br
1.95
2.07
1.05
2.00
3.09
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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110.81
108.81
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13.78
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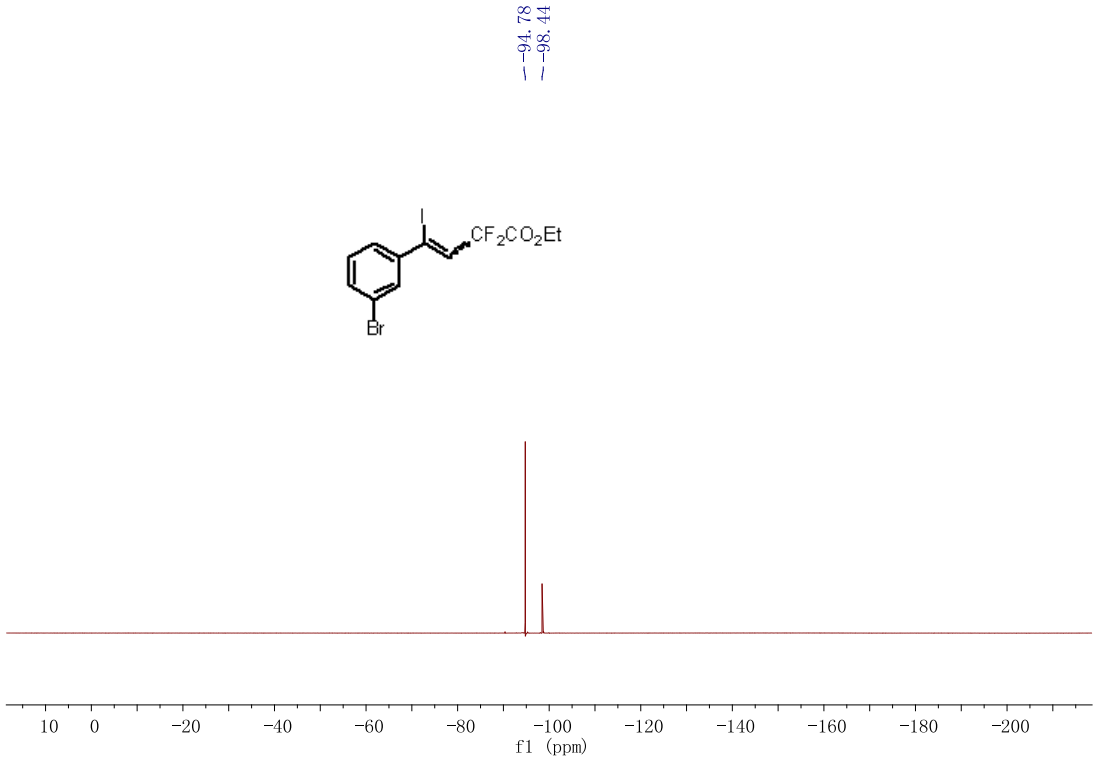
CF2CO2Et
Br
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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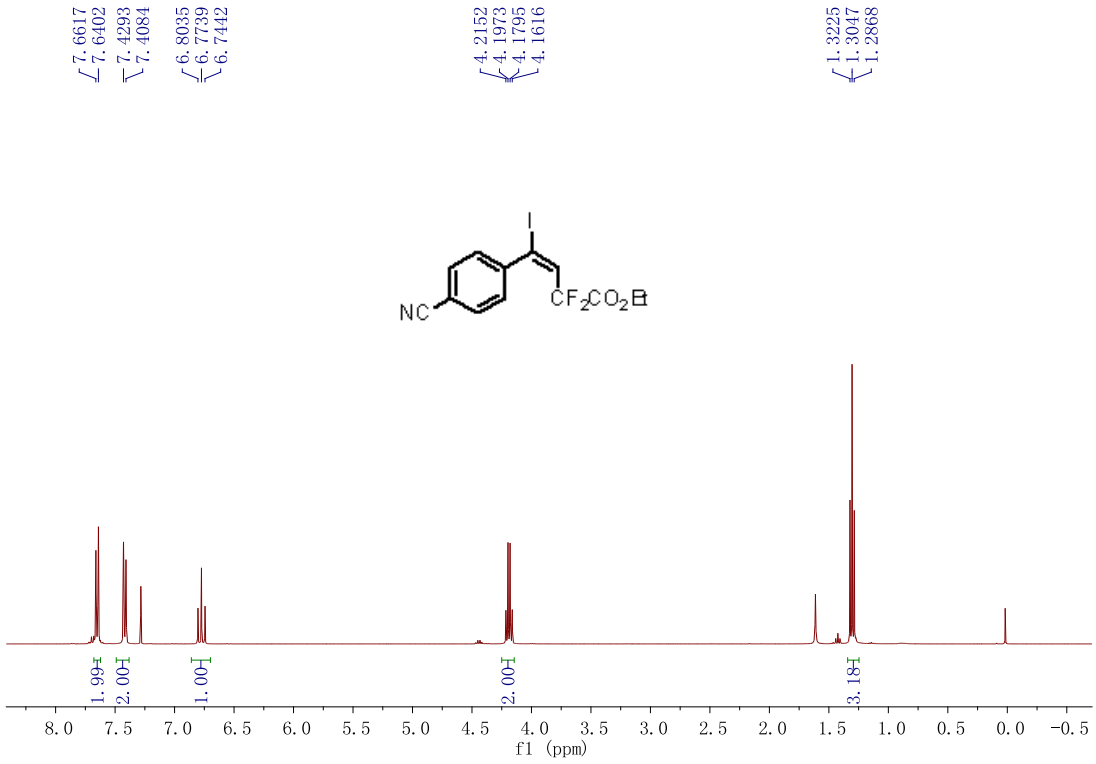
-200
f1 (ppm)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1.3047
1.2868
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1.00
2.00
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7.5
7.0
6.5
6.0
5.5
5.0
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3.0
2.5
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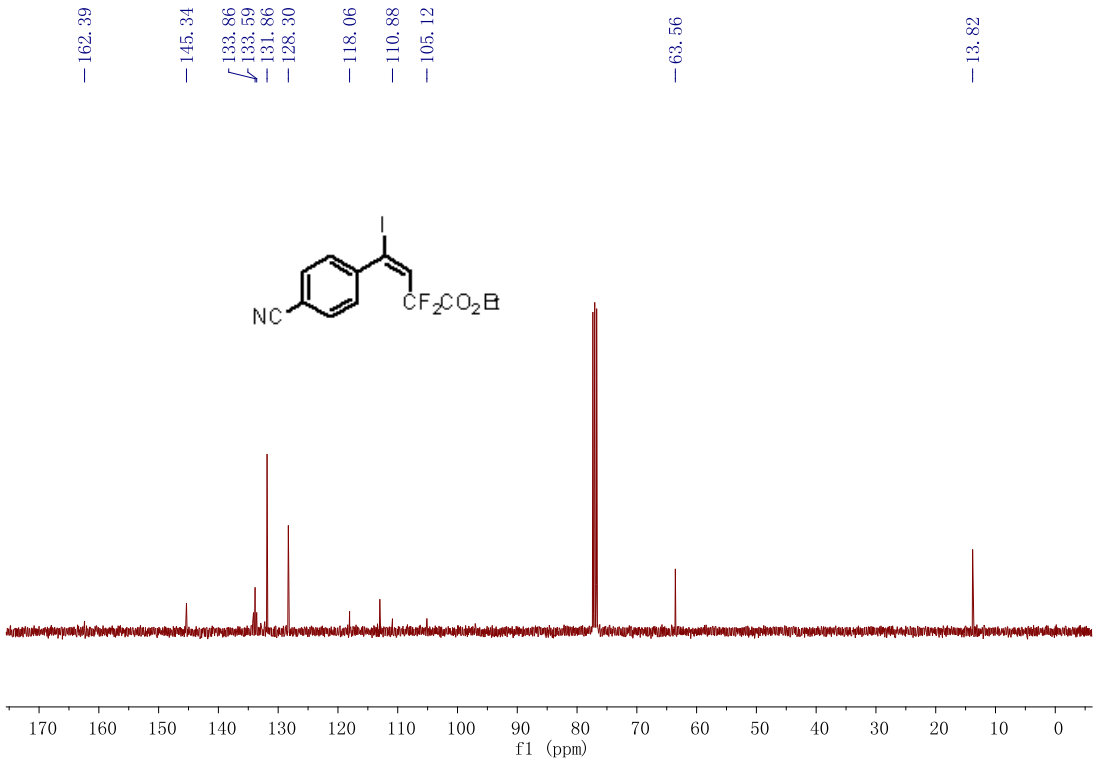
f1 (ppm)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13.82
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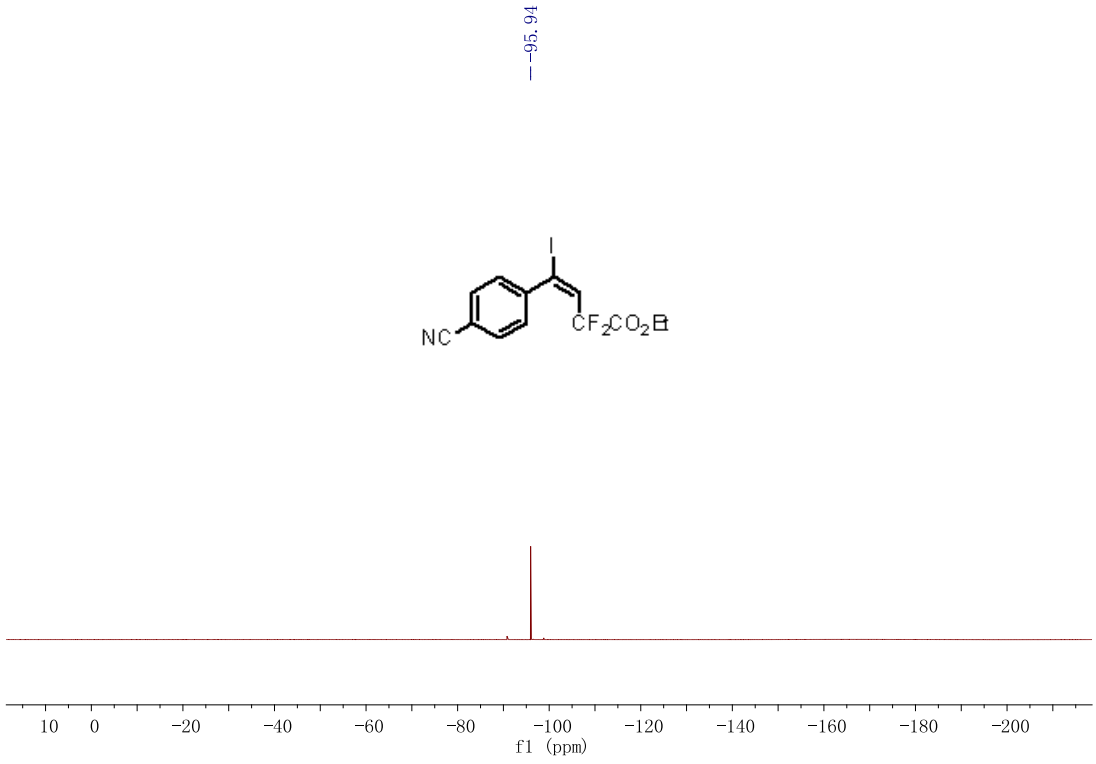
NC
CF2CO2Et
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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CF2CO2Et
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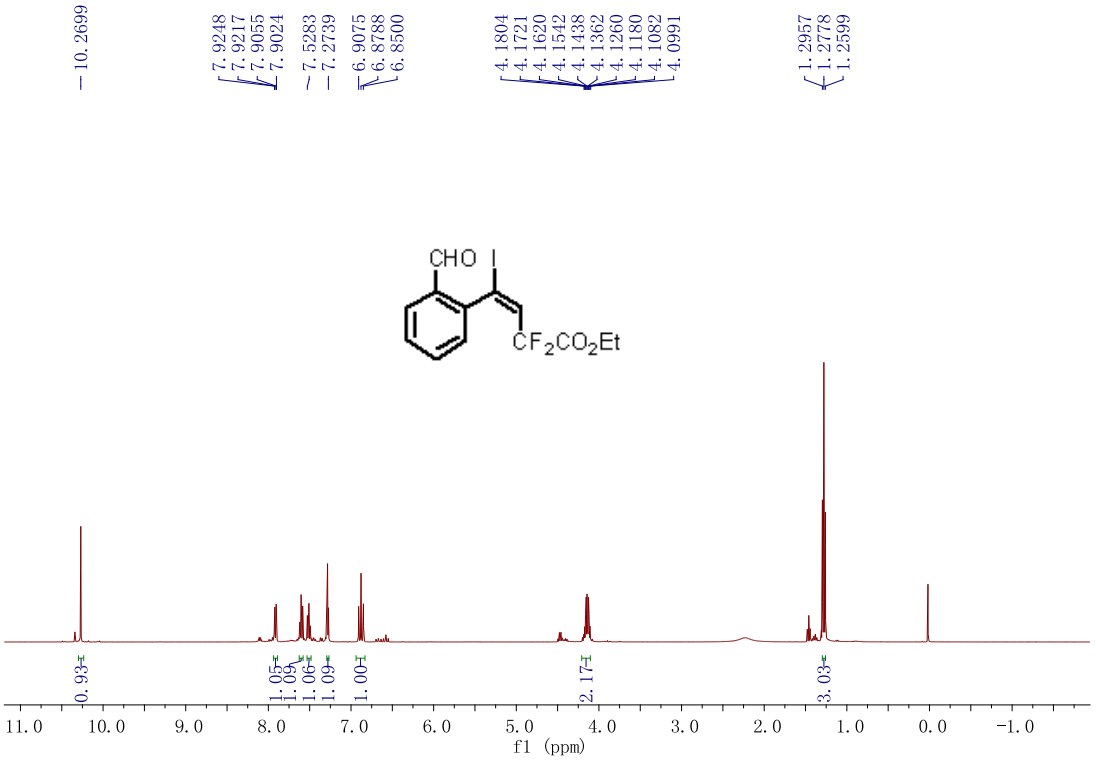
f1 (ppm)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4.1721
4.1620
4.1542
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4.1362
4.1260
4.1180
4.1082
4.0991
1.2957
1.2778
1.2599
CHO
I
CF2CO2Et
0.93
1.05
1.09
1.06
1.09
1.00
2.17
3.03
11.0
10.0
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6.0
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3.0
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1.0
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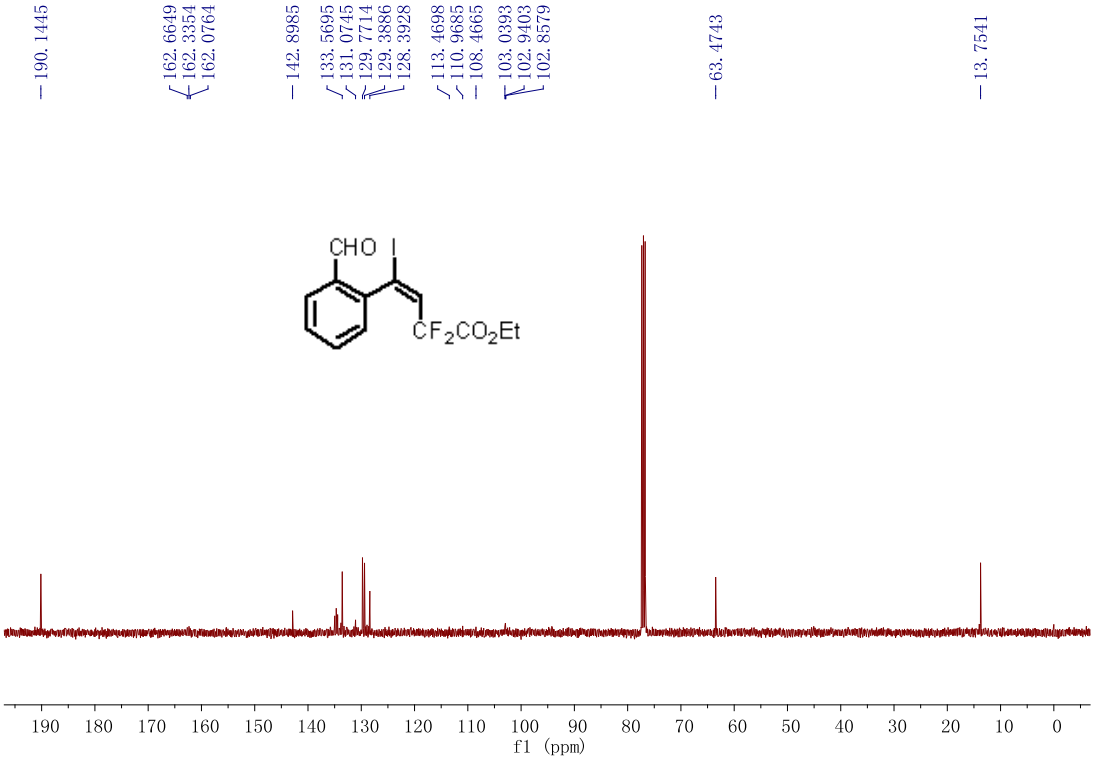
-1.0
f1 (ppm)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102.9403
102.8579
63.4743
13.7541
CHO
I
CF2CO2Et
190
180
170
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120
110
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90
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70
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50
40
30
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10
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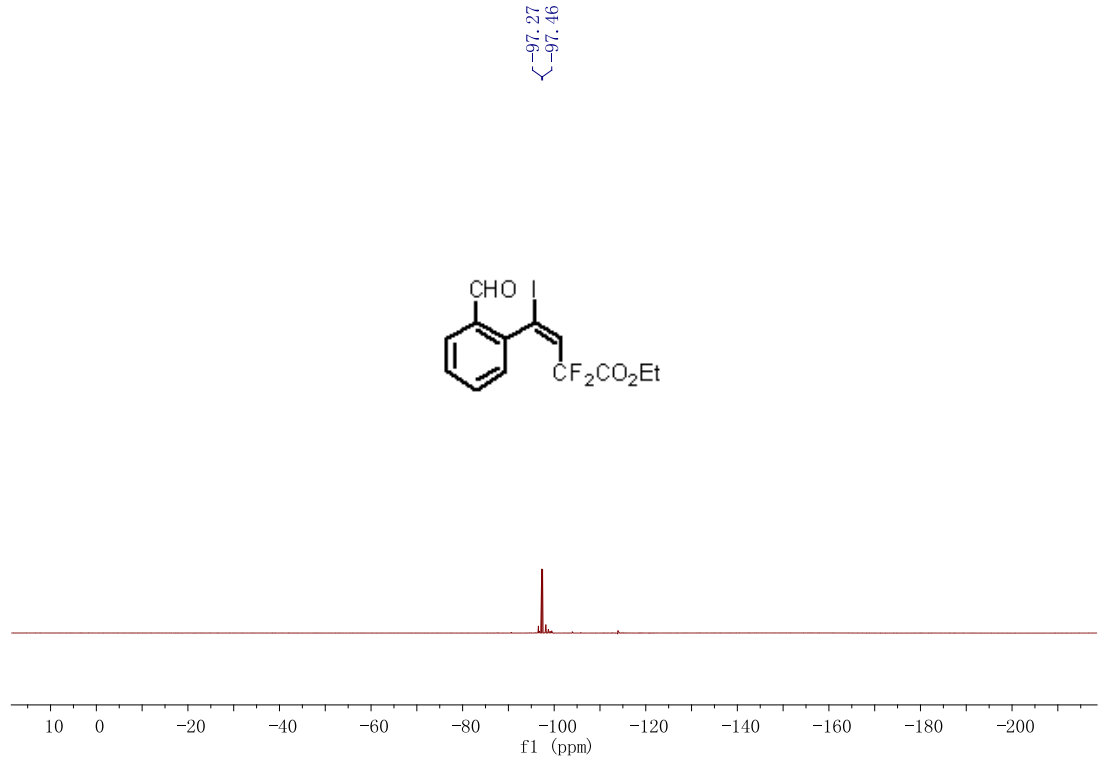
f1 (ppm)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-97.46
CHO
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-60
-80
-100
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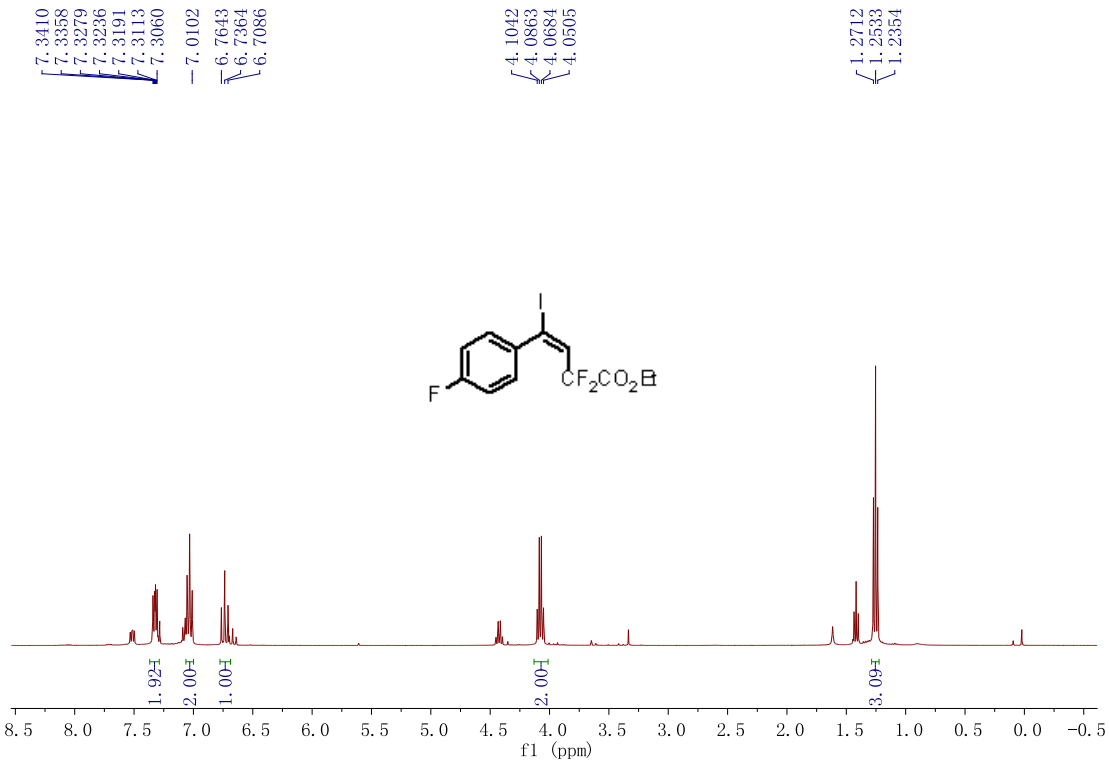
-140
-160
-180
-200
f1 (ppm)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7.3191
7.3113
7.3060
7.0102
6.7643
6.7364
6.7086
4.1042
4.0863
4.0684
4.0505
1.2712
1.2533
1.2354
I
F
CF2CO2Et
1.92
2.00
1.00
2.00
3.09
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
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3.0
2.5
2.0
1.5
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0.5
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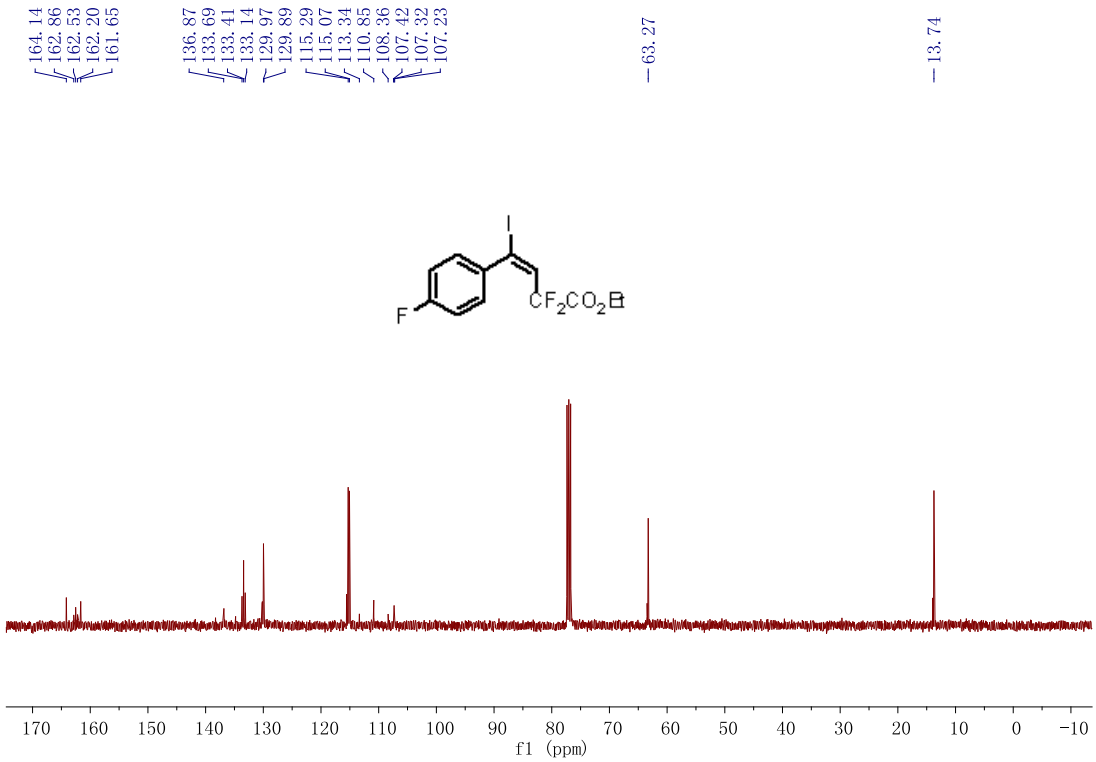
f1 (ppm)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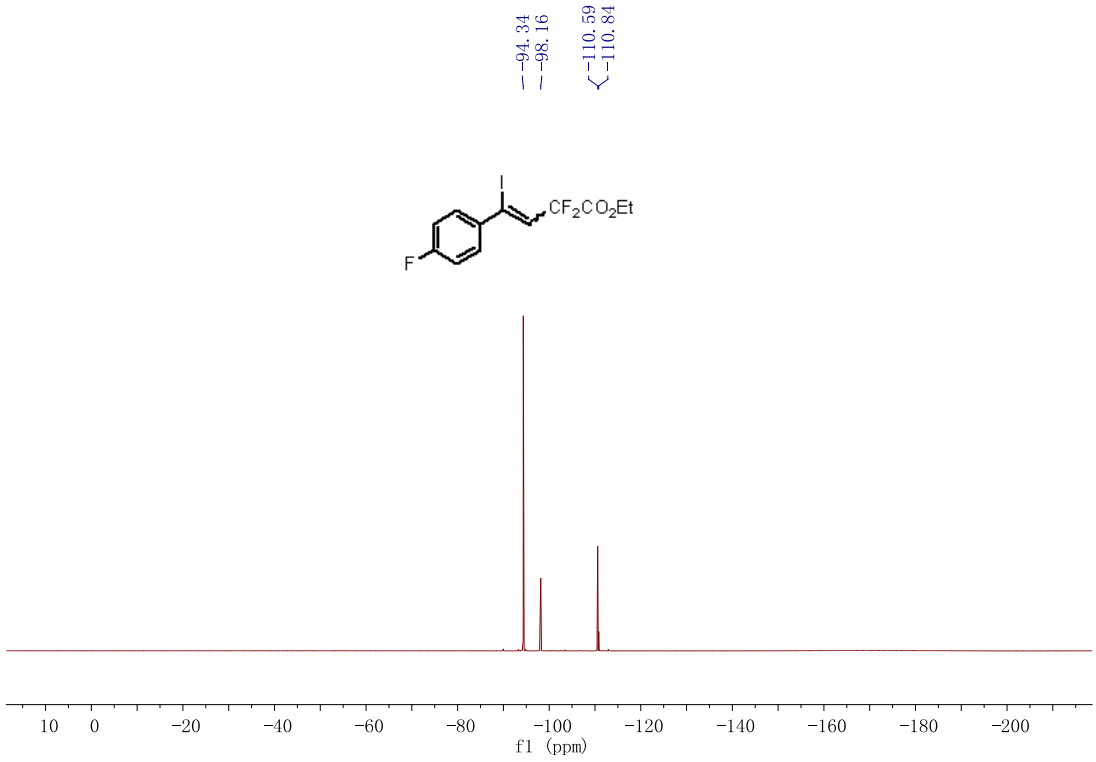
136.87
133.69
133.41
133.14
129.97
129.89
115.29
115.07
113.34
110.85
108.36
107.42
107.32
107.23
63.27
13.74
I
F
CF2CO2Et
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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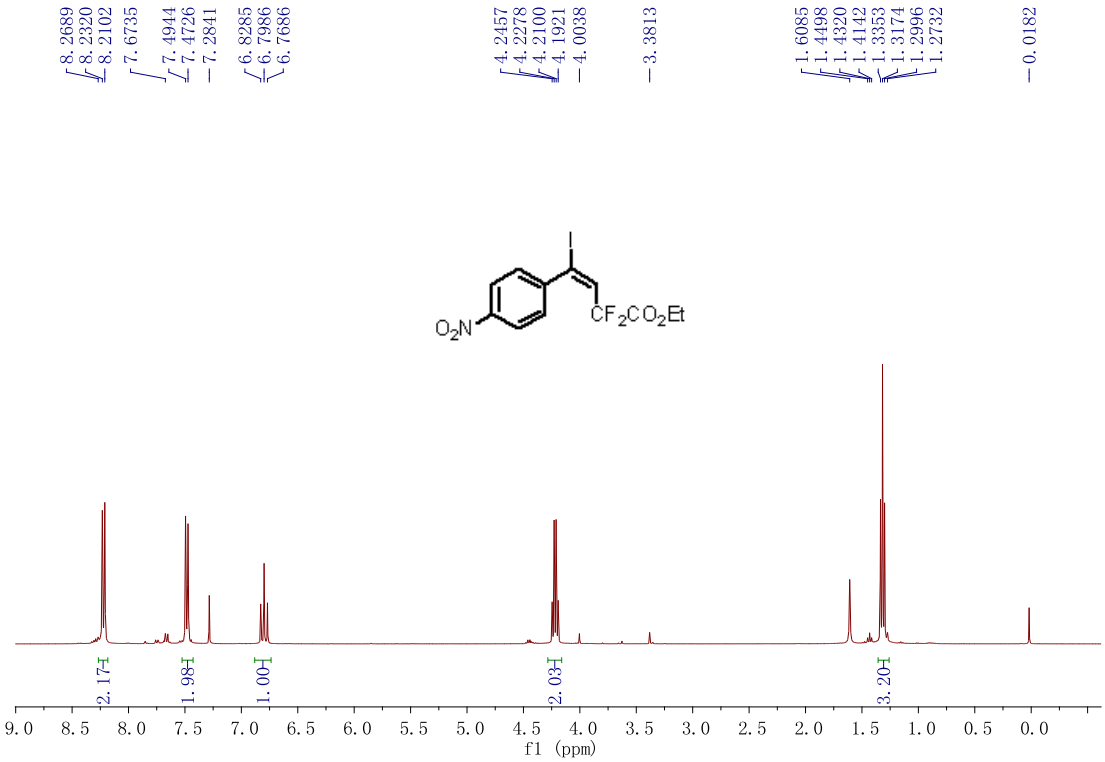
-110.59
-110.84
I
F
CF2CO2Et
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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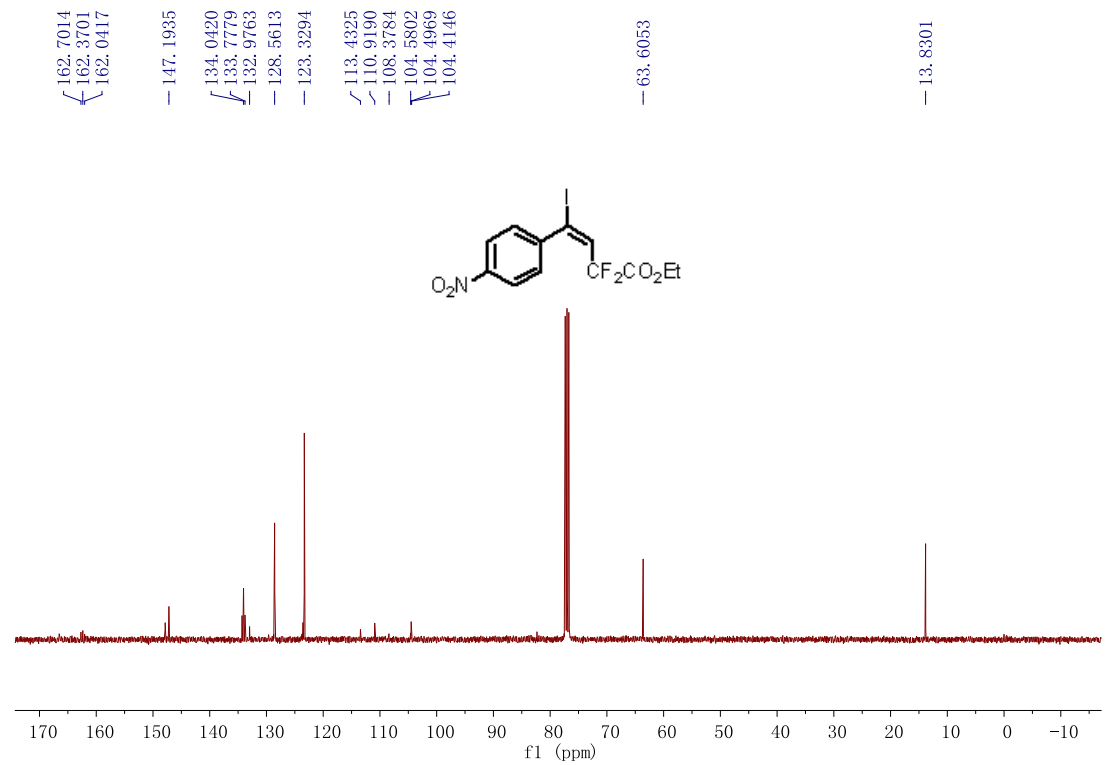
7.4944
7.4726
7.2841
6.8285
6.7986
6.7686
4.2457
4.2278
4.2100
4.1921
4.0038
3.3813
1.6085
1.4498
1.4320
1.4142
1.3353
1.3174
1.2996
1.2732
0.0182
O2N
CF2CO2Et
2.17
1.98
1.00
2.03
3.20
f1 (ppm)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162.3701
162.0417
147.1935
134.0420
133.7779
132.9763
128.5613
123.3294
113.4325
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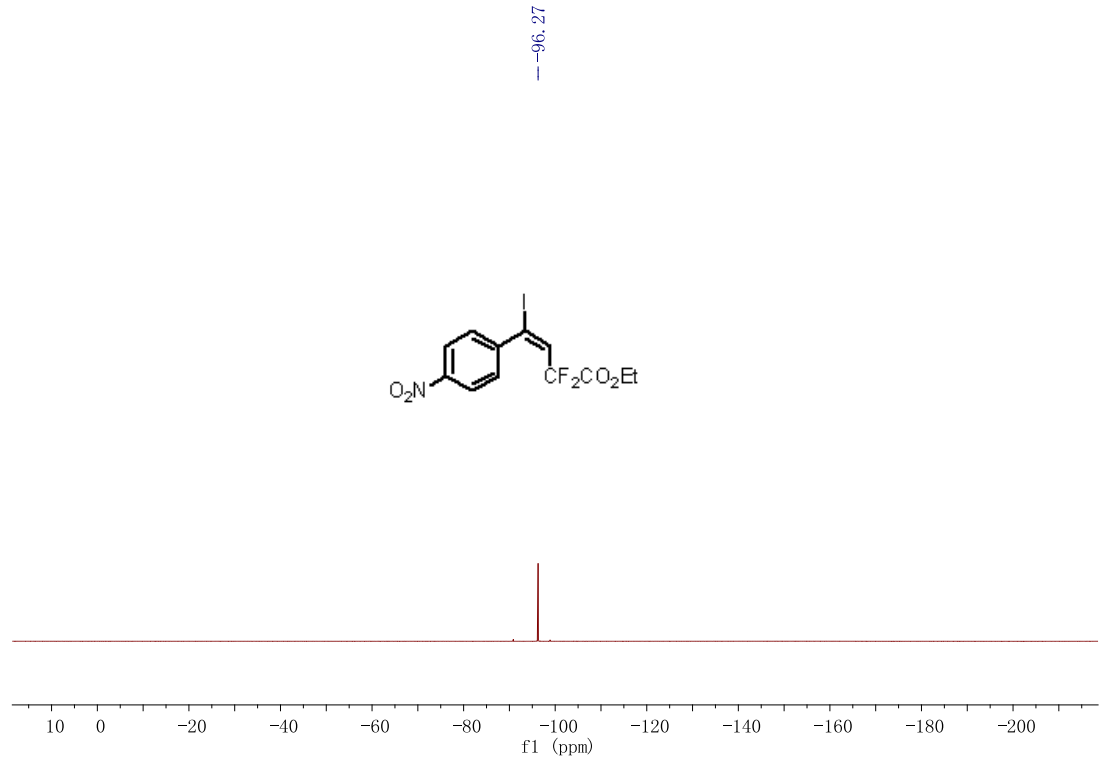
108.3784
104.5802
104.4969
104.4146
63.6053
13.8301
O2N
CF2CO2Et
f1 (ppm)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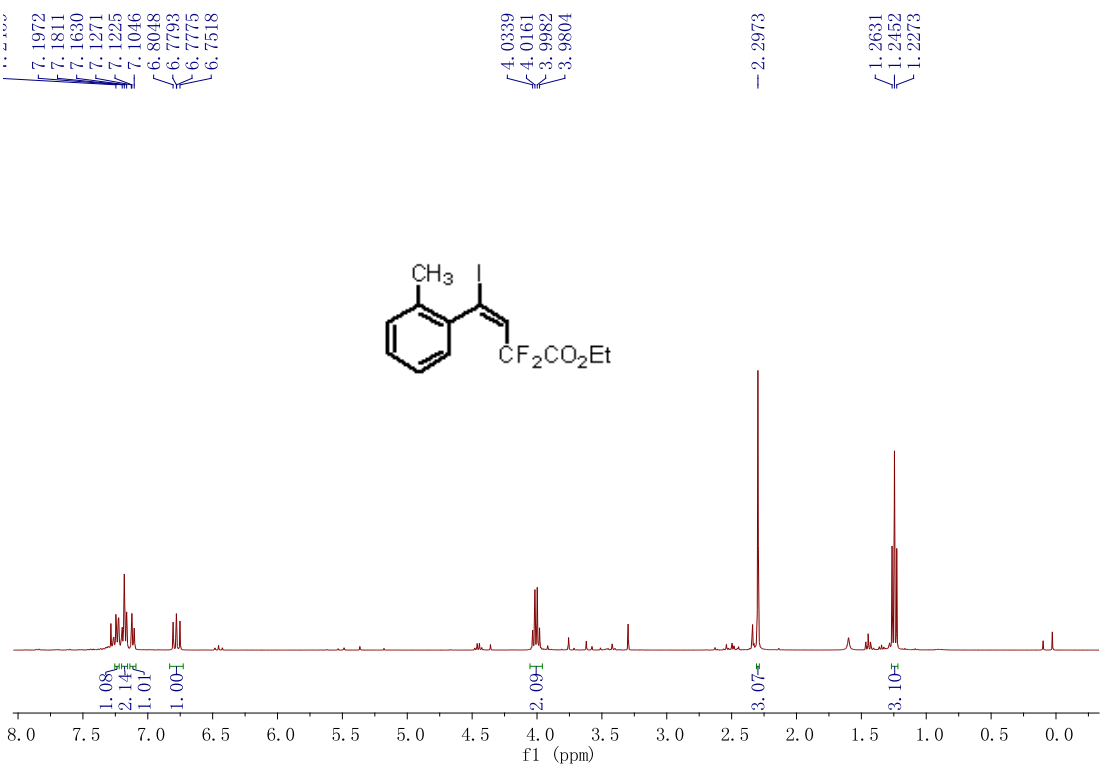
O2N
CF2CO2Et
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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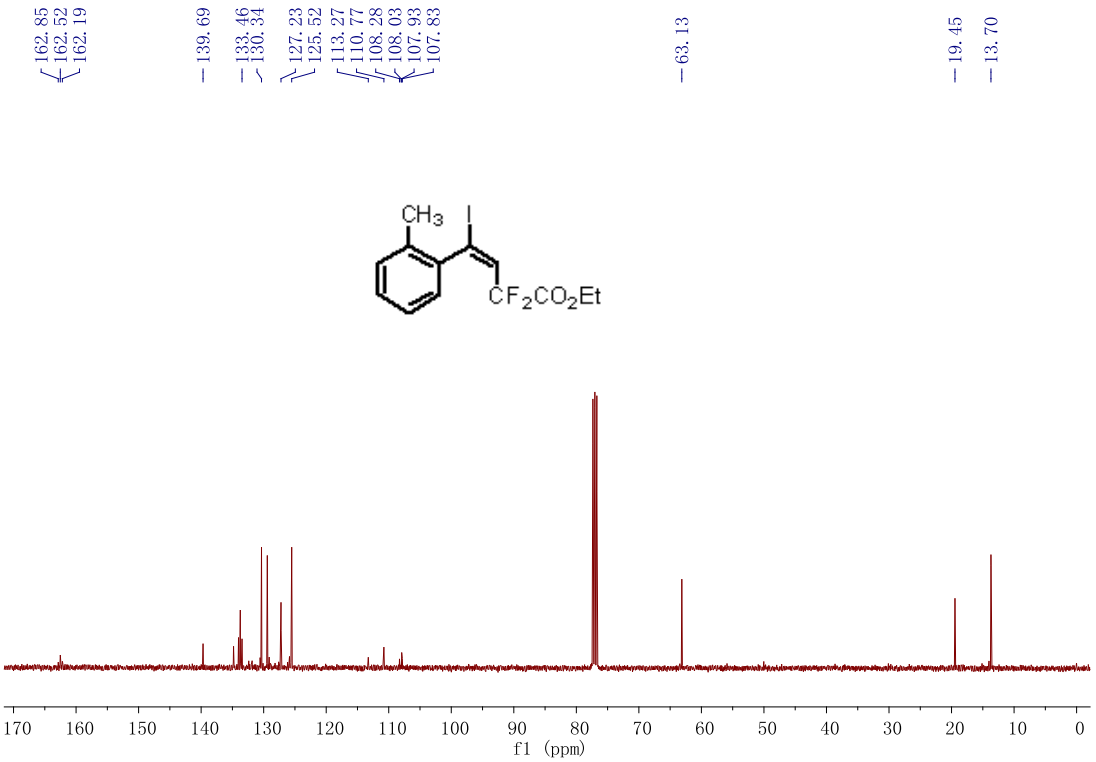
7.1811
7.1630
7.1271
7.1225
7.1046
6.8048
6.7793
6.7775
6.7518
4.0339
4.0161
3.9982
3.9804
2.2973
1.2631
1.2452
1.2273
CH3
I
CF2CO2Et
1.08
2.14
1.01
1.00
2.09
3.07
3.10
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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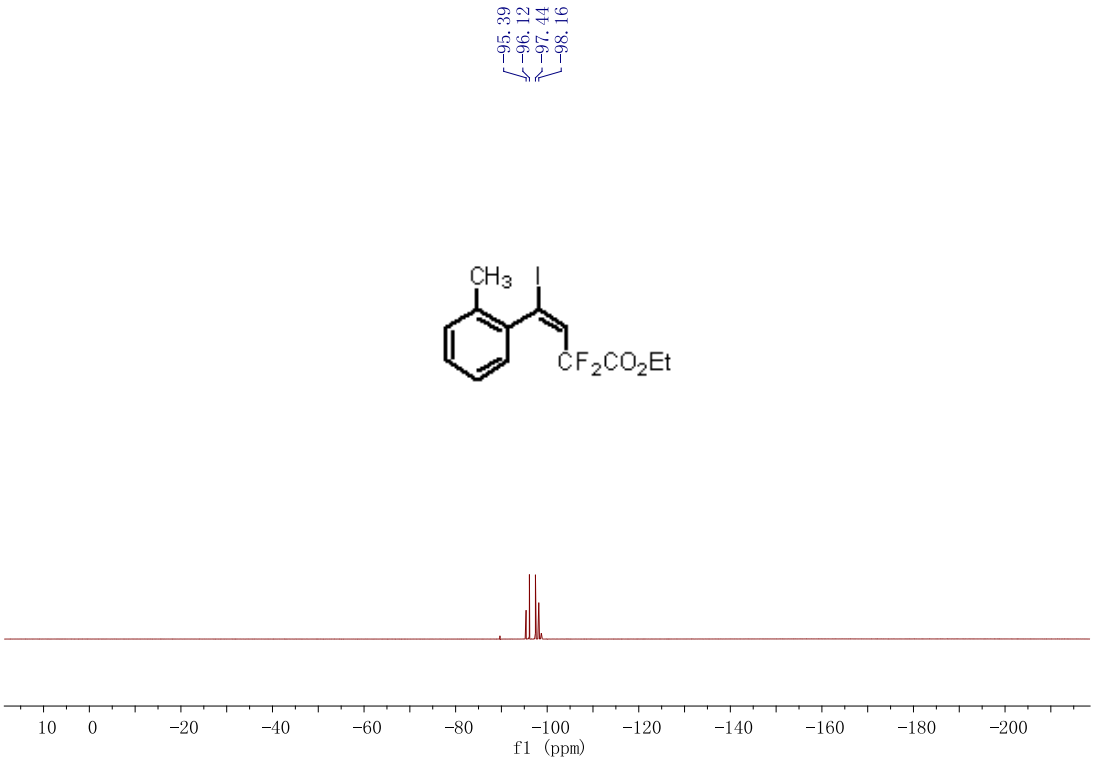
162.52
162.19
139.69
133.46
130.34
127.23
125.52
113.27
110.77
108.28
108.03
107.93
107.83
63.13
19.45
13.70
CH3
I
CF2CO2Et
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-95.39
-96.12
-97.44
-98.16
CH3
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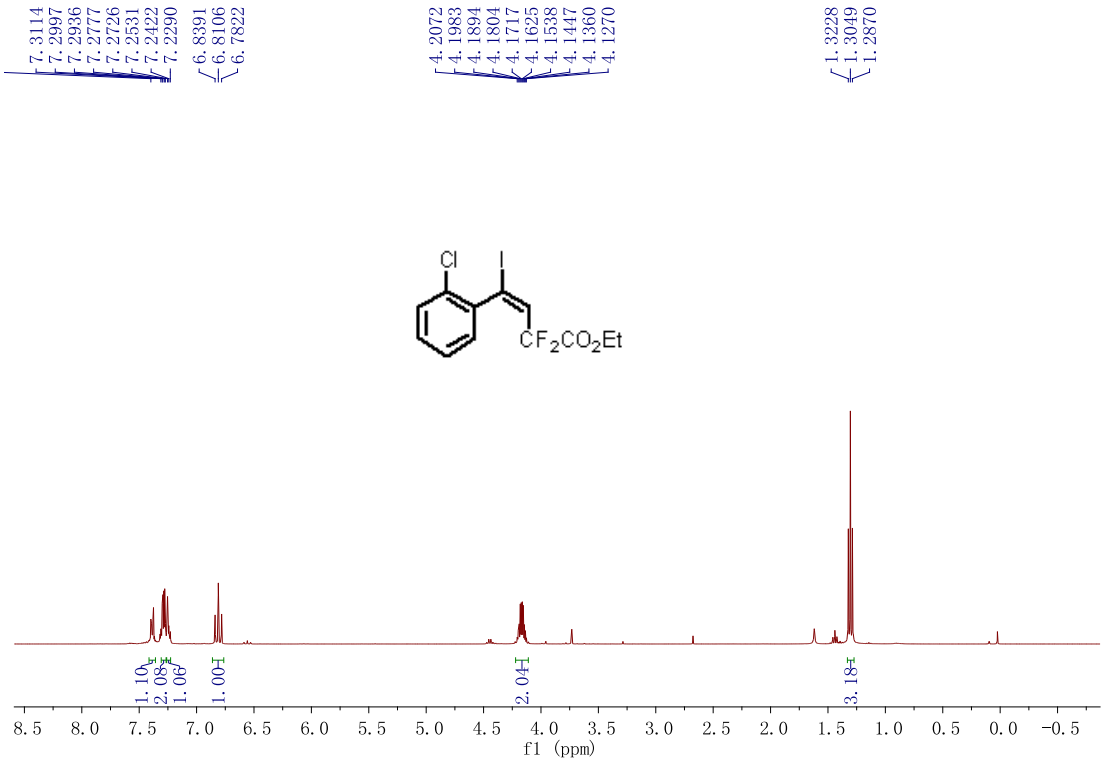
CF2CO2Et
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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7.2997
7.2936
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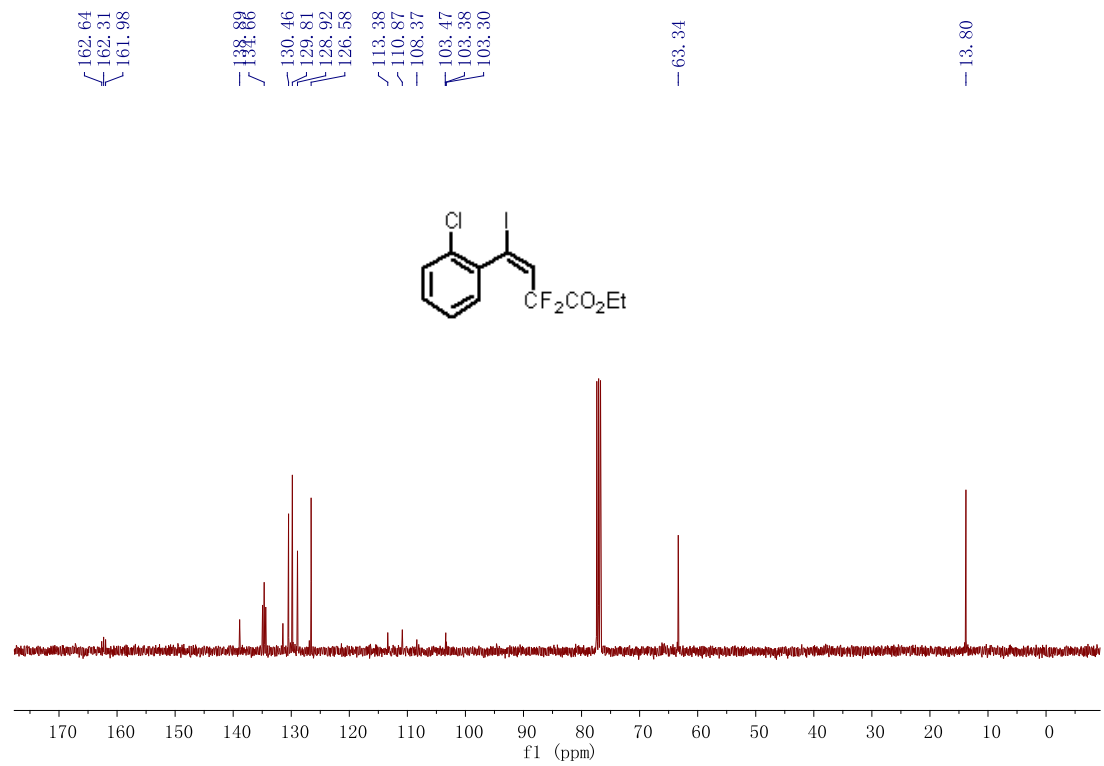
7.2726
7.2531
7.2422
7.2290
6.8391
6.8106
6.7822
4.2072
4.1983
4.1894
4.1804
4.1717
4.1625
4.1538
4.1447
4.1360
4.1270
1.3228
1.3049
1.2870
Cl
I
CF2CO2Et
1.10
2.08
1.06
1.00
2.04
3.18
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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162.31
161.98
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128.92
126.58
113.38
110.87
108.37
103.47
103.38
103.30
63.34
13.80
Cl
I
CF2CO2Et
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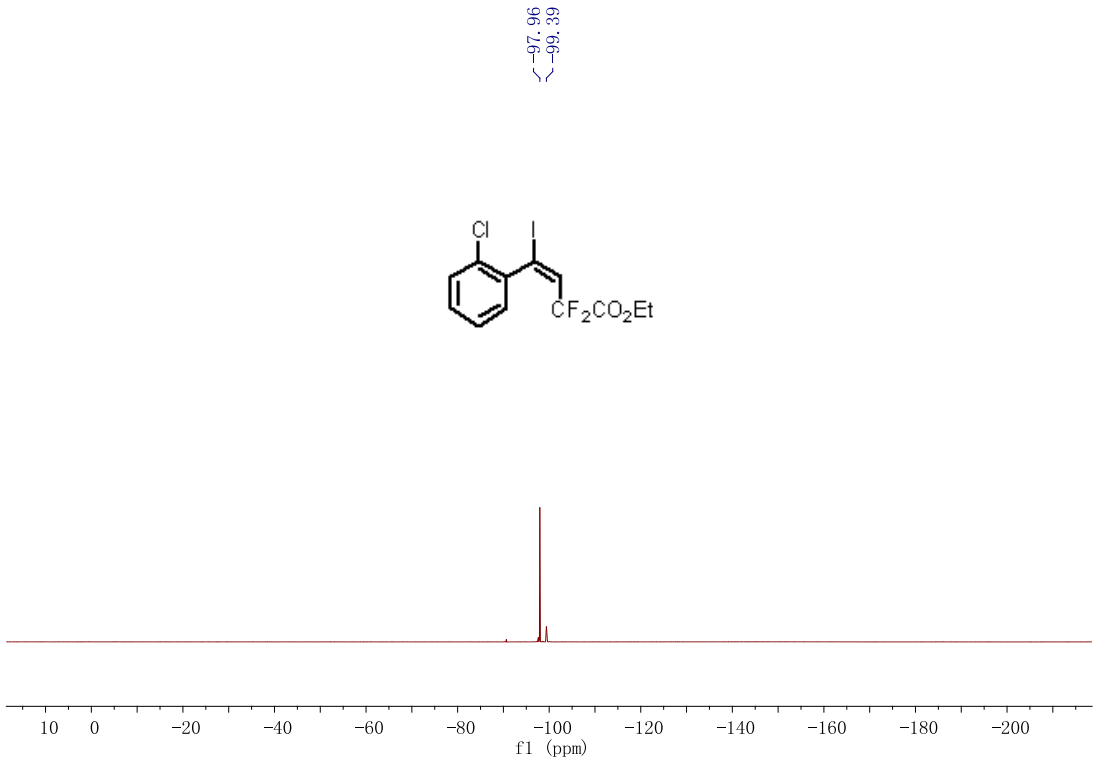
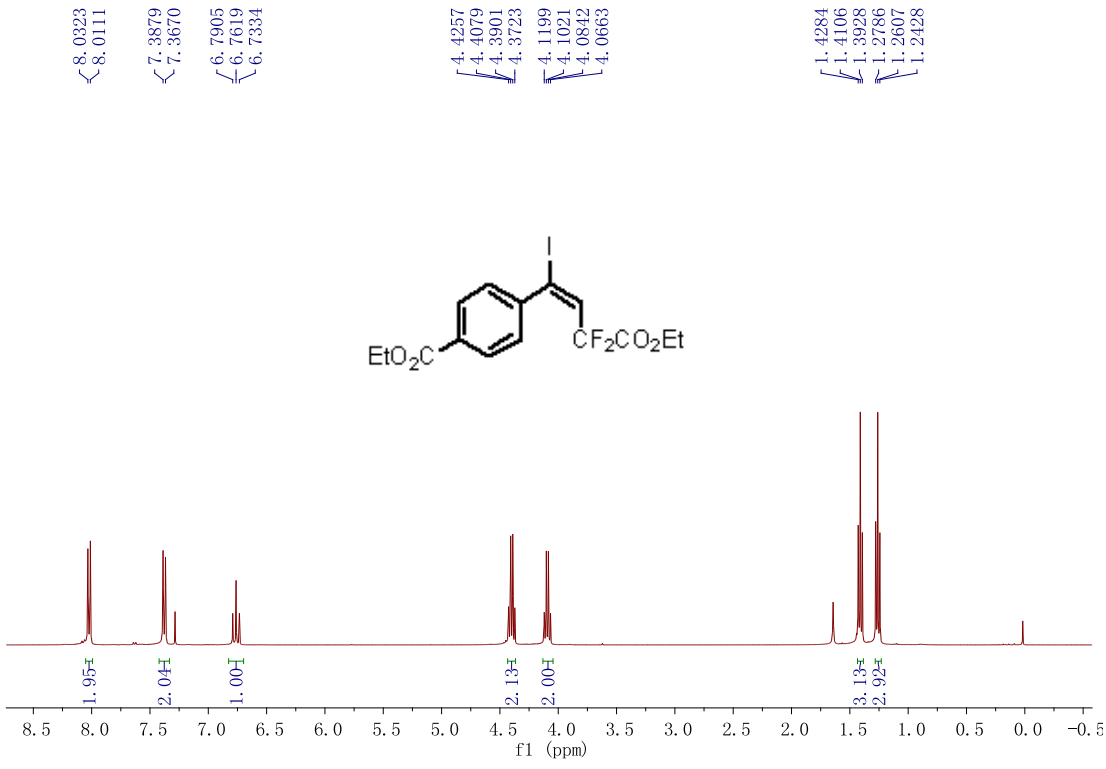
f1 (ppm)


-97.96
-99.39
Cl
I
CF2CO2Et
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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8.0111
7.3879
7.3670
6.7905
6.7619
6.7334
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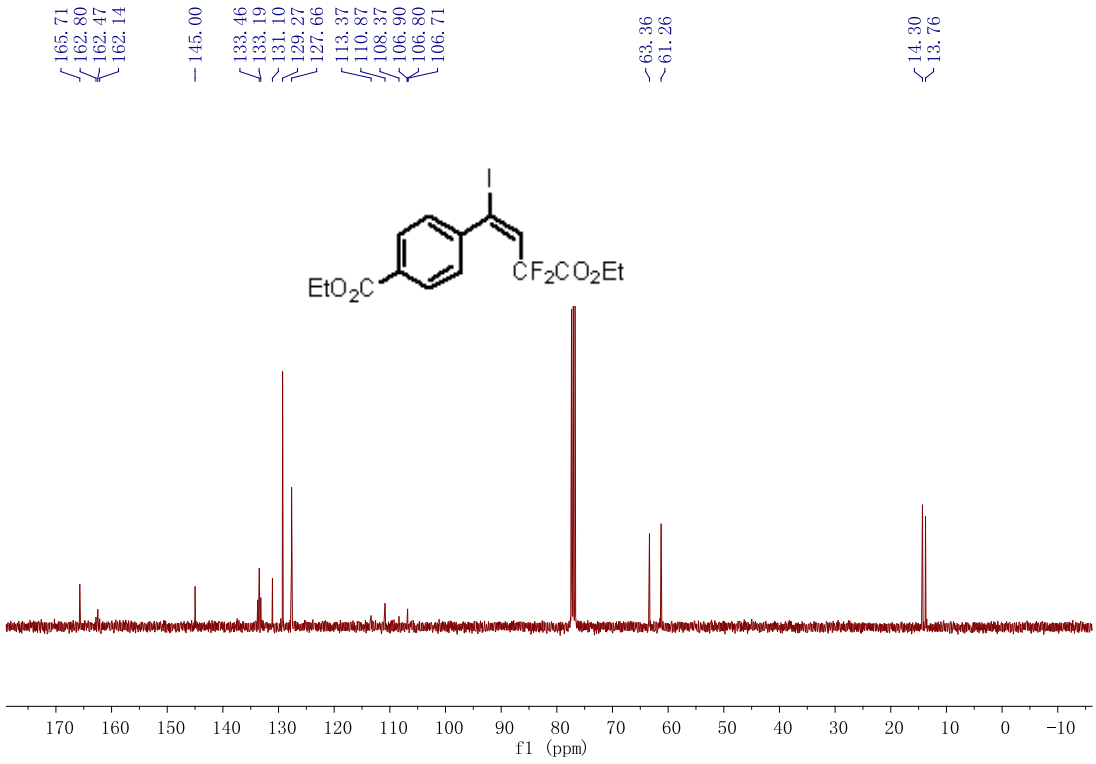
4.4079
4.3901
4.3723
4.1199
4.1021
4.0842
4.0663
1.4284
1.4106
1.3928
1.2786
1.2607
1.2428
I
EtO2C
CF2CO2Et
1.95
2.04
1.00
2.13
2.00
3.13
2.92
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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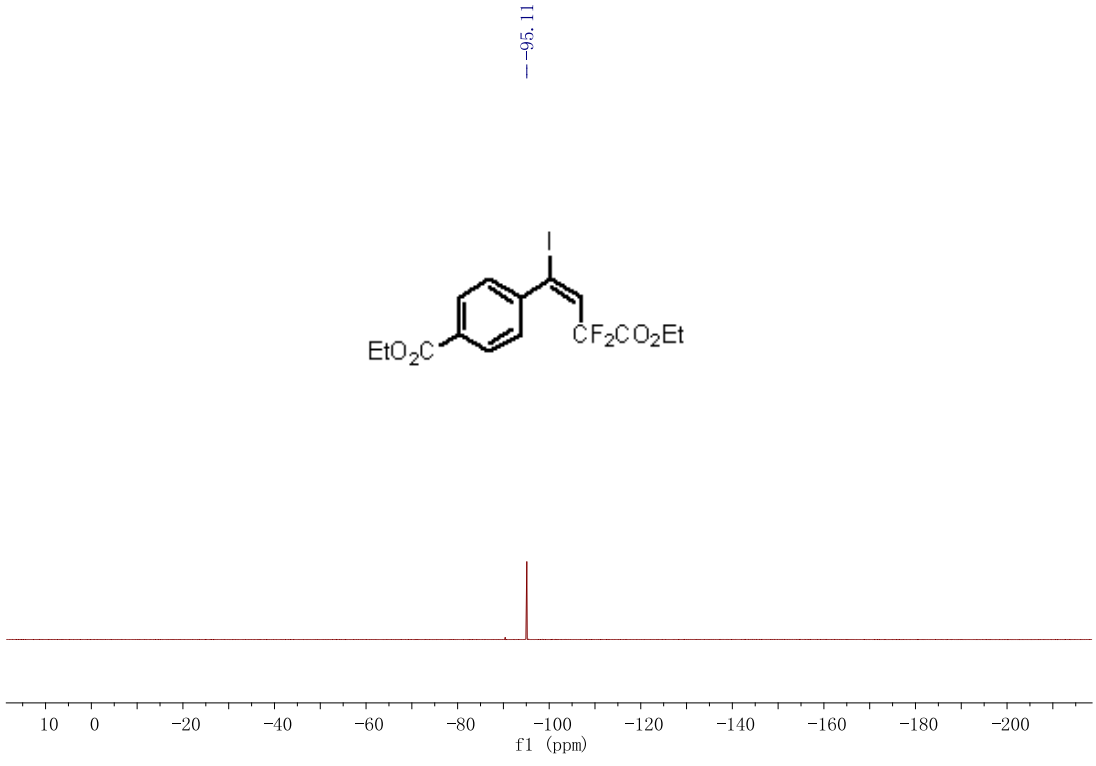
133.19
131.10
129.27
127.66
113.37
110.87
108.37
106.90
106.80
106.71
63.36
61.26
14.30
13.76
I
EtO2C
CF2CO2Et
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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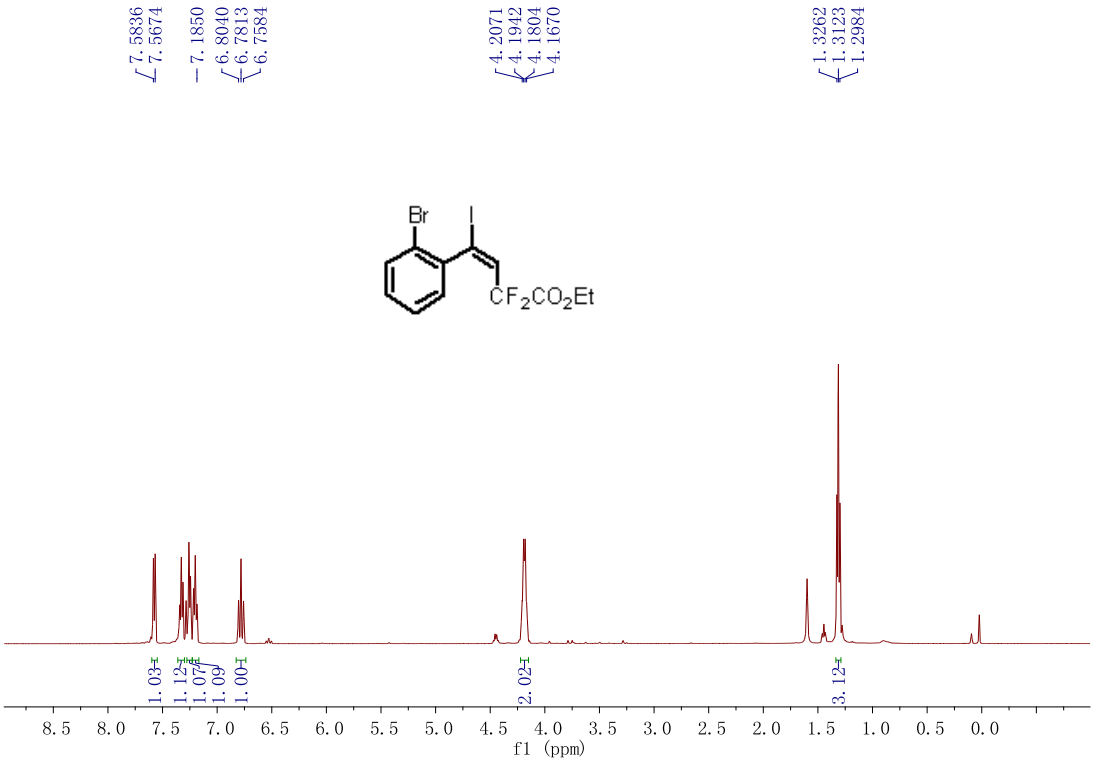
I
EtO2C
CF2CO2Et
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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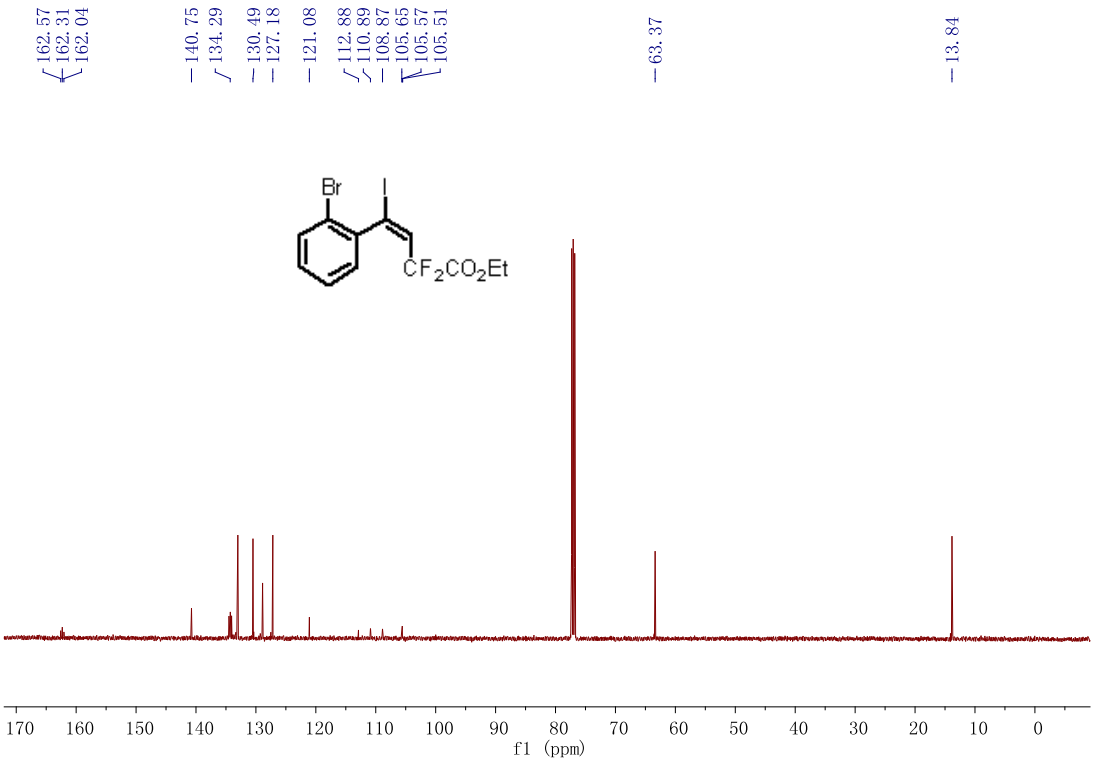
6.7813
6.7584
4.2071
4.1942
4.1804
4.1670
1.3262
1.3123
1.2984
Br
I
CF2CO2Et
1.03
1.12
1.07
1.09
1.00
2.02
3.12
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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162.31
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127.18
121.08
112.88
110.89
108.87
105.65
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63.37
13.84
Br
I
CF2CO2Et
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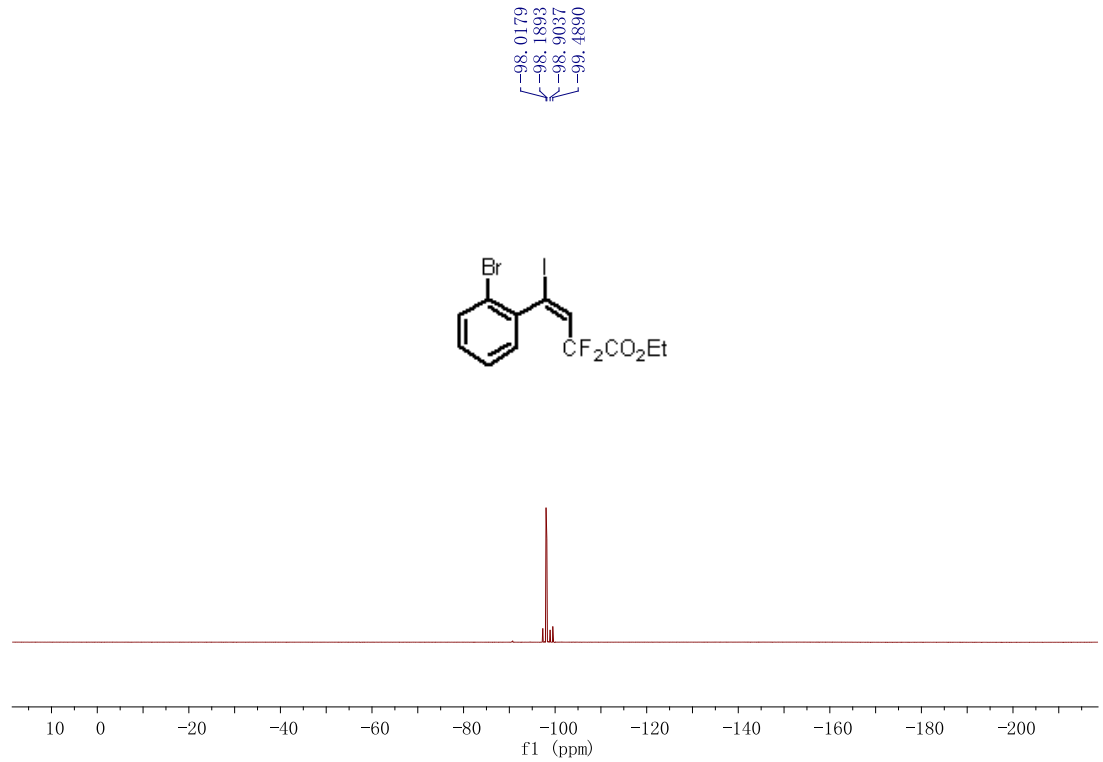
f1 (ppm)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-99.4890
Br
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0
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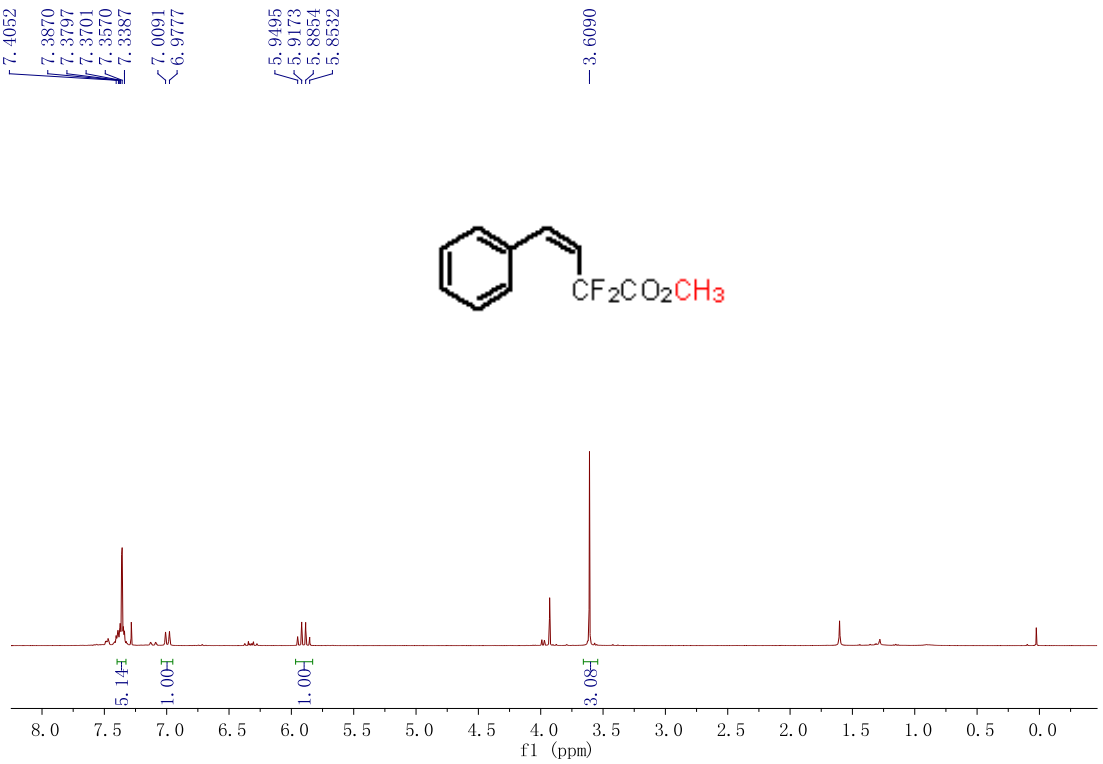
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.0091
6.9777
5.9495
5.9173
5.8854
5.8532
3.6090
CF2CO2CH3
5.14
1.00
1.00
3.08
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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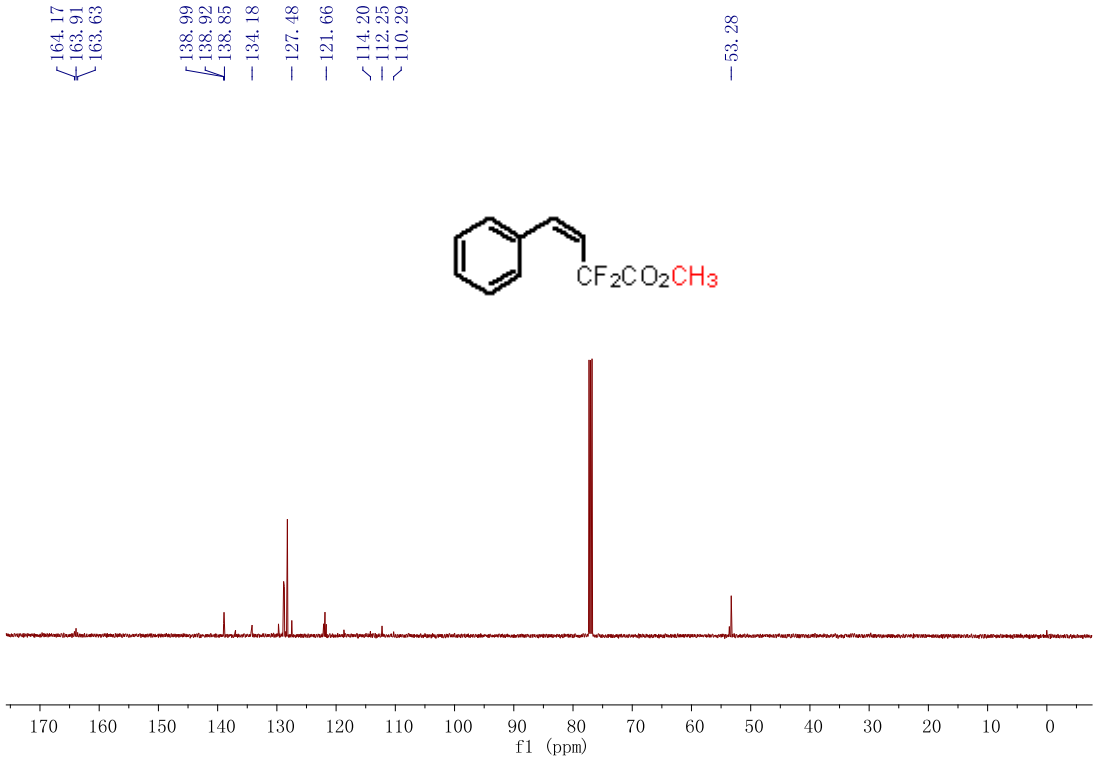
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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127.48
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114.20
112.25
110.29
53.28
CF2CO2CH3
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160
150
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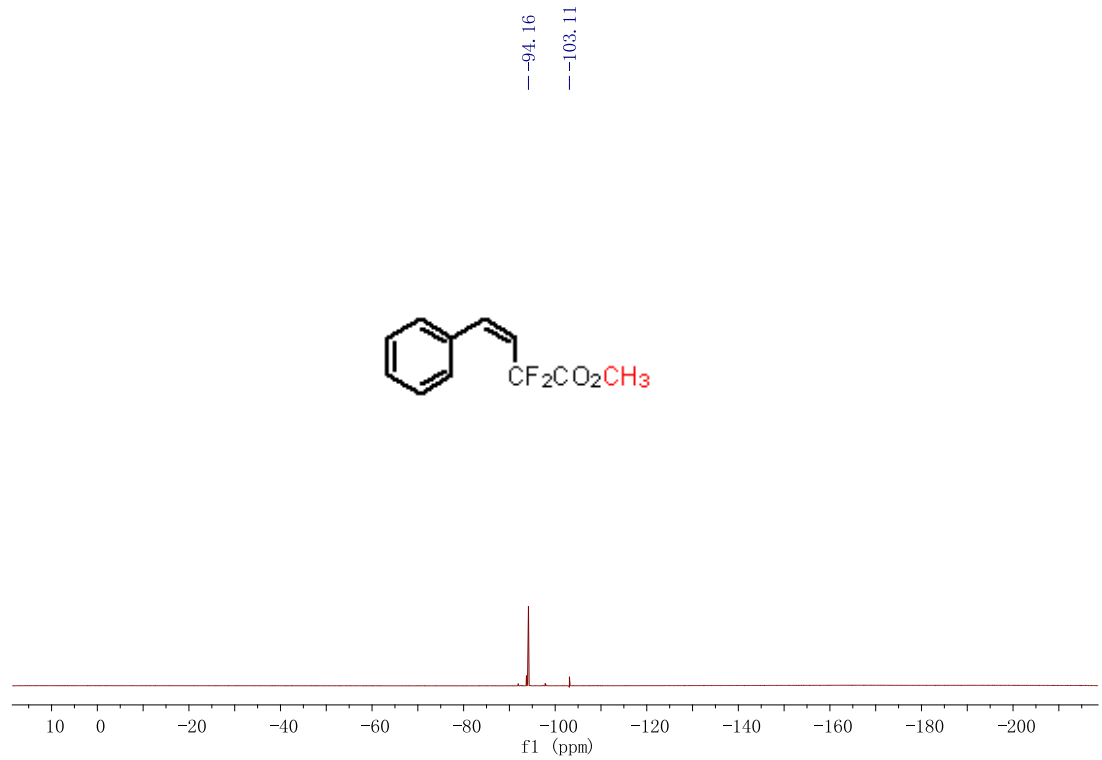
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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10
0
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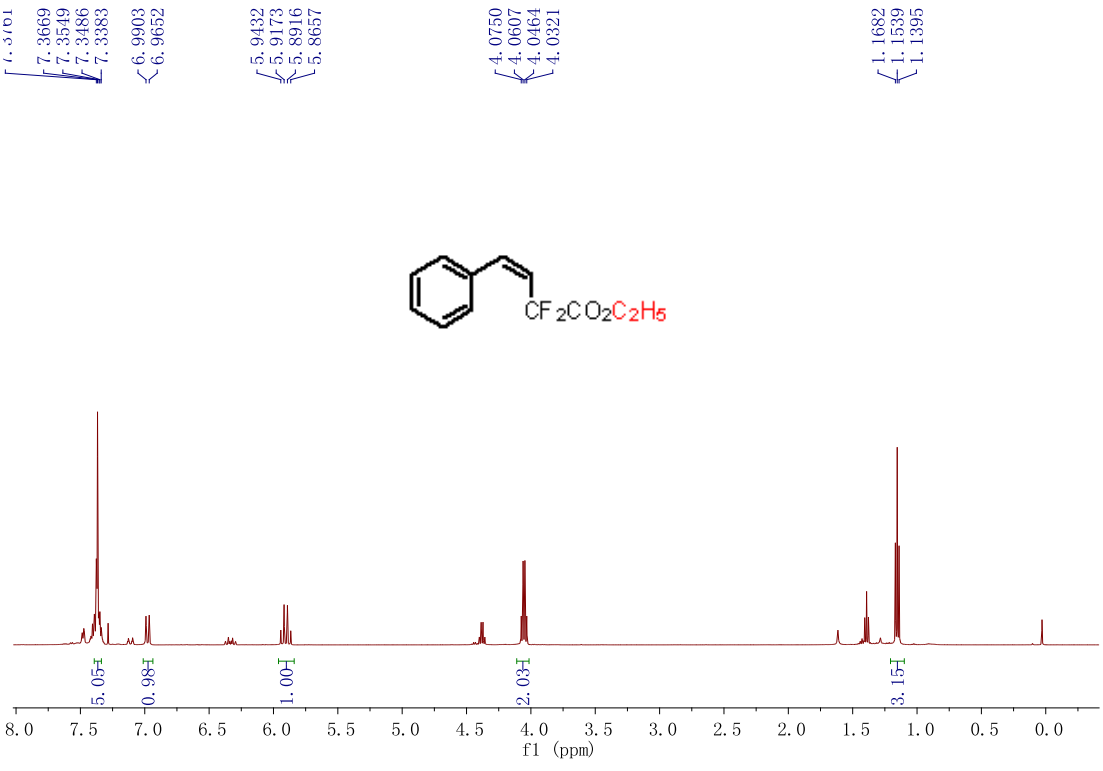
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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4.0750
4.0607
4.0464
4.0321
1.1682
1.1539
1.1395
CF2CO2C2H5
5.05H
0.98H
1.00H
2.03H
3.15H
8.0
7.5
7.0
6.5
6.0
5.5
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3.0
2.5
2.0
1.5
1.0
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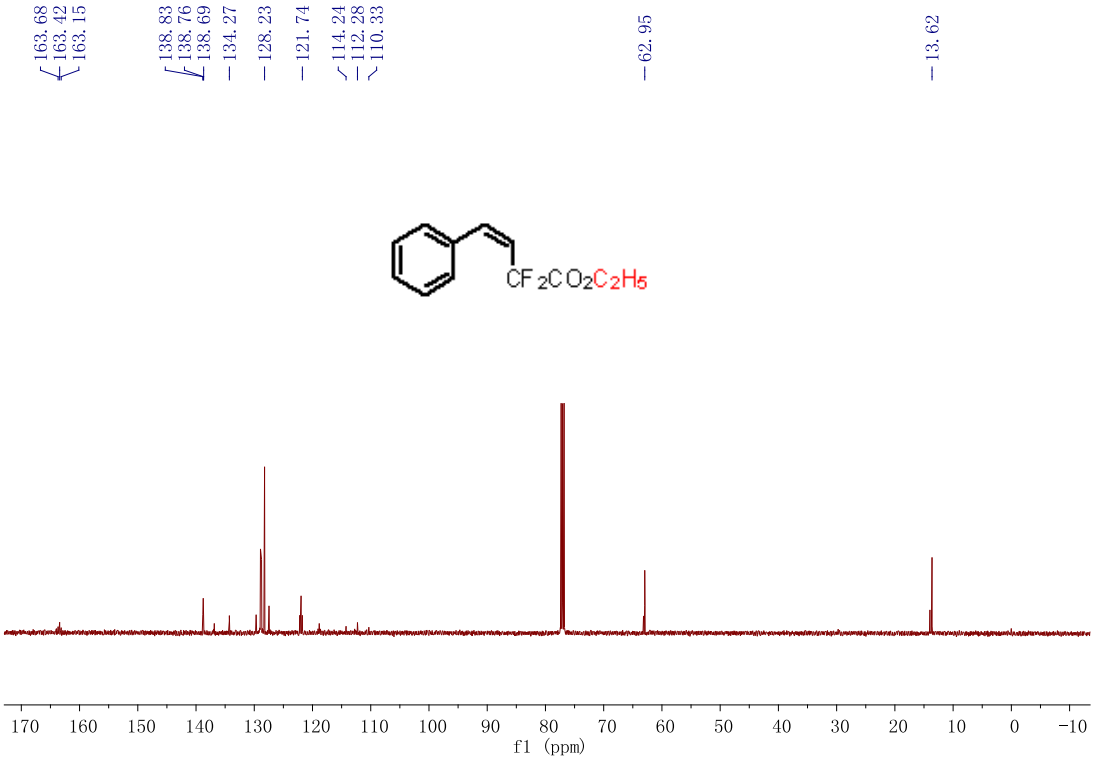
0.0
f1 (ppm)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128.23
121.74
114.24
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62.95
13.62
CF2CO2C2H5
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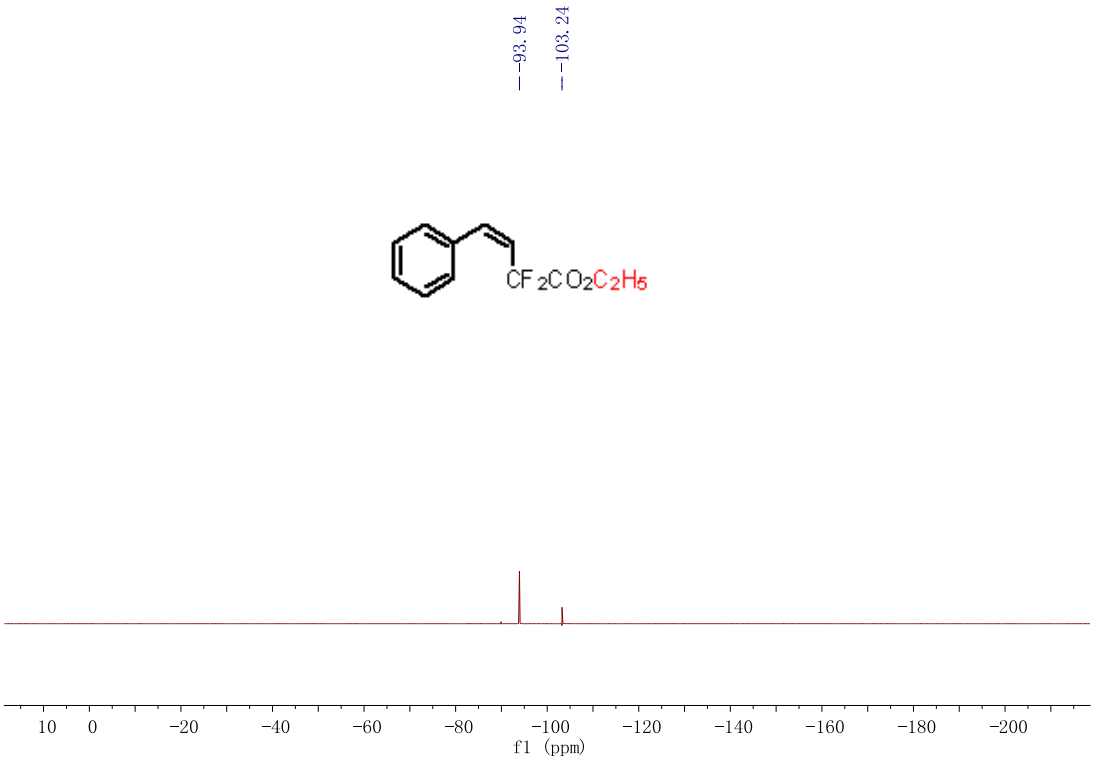
f1 (ppm)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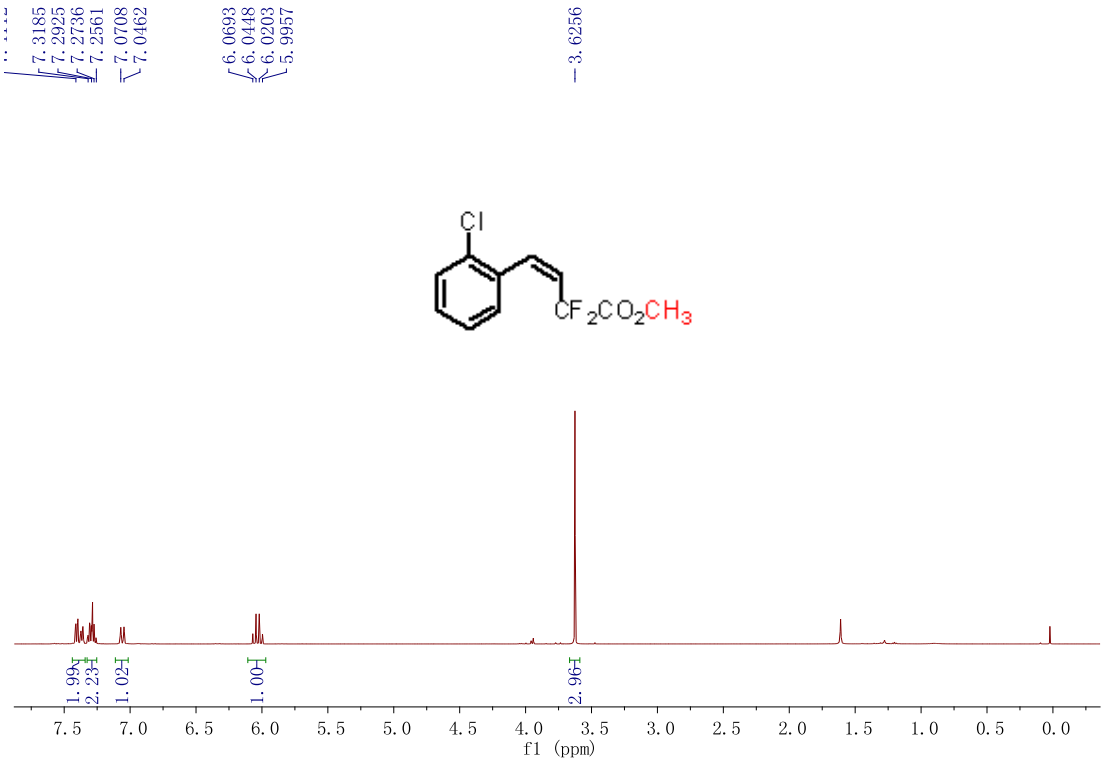
−103.24
CF2CO2C2H5
10 0 −20 −40 −60 −80 −100 −120 −140 −160 −180 −200
f1 (ppm)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6.0448
6.0203
5.9957
3.6256
Cl
CF2CO2CH3
1.99
2.23
1.02
1.00
2.96
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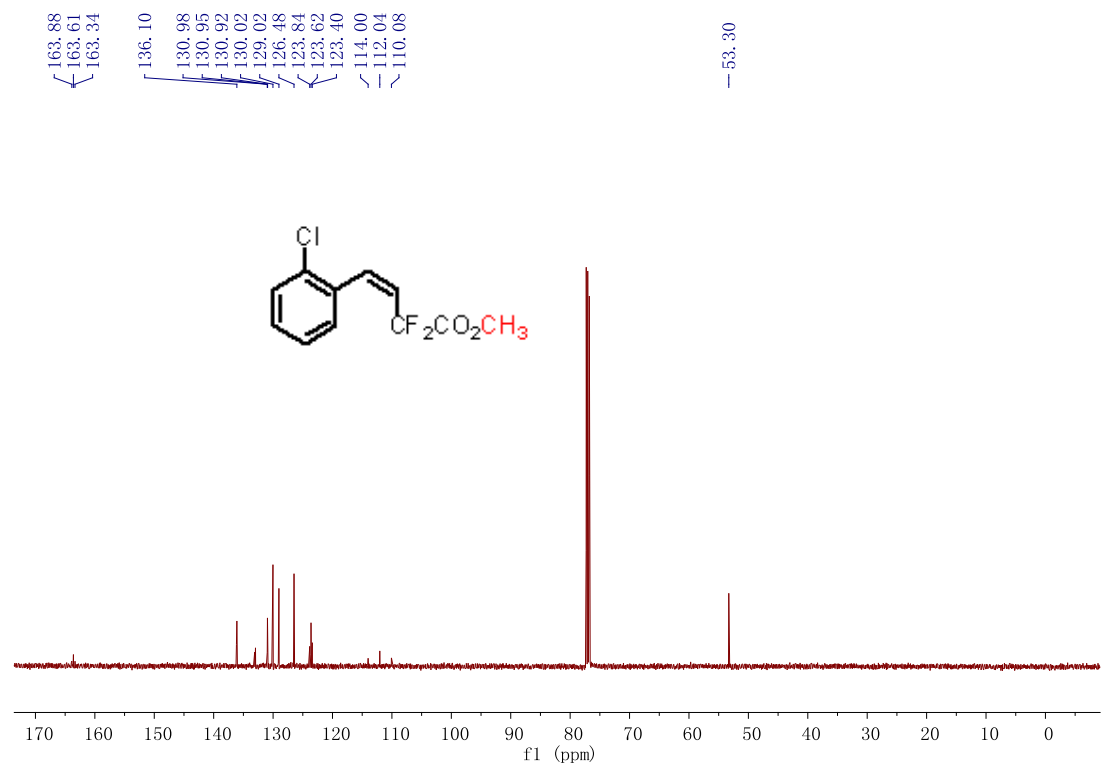
f1 (ppm)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130.02
129.02
126.48
123.84
123.62
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114.00
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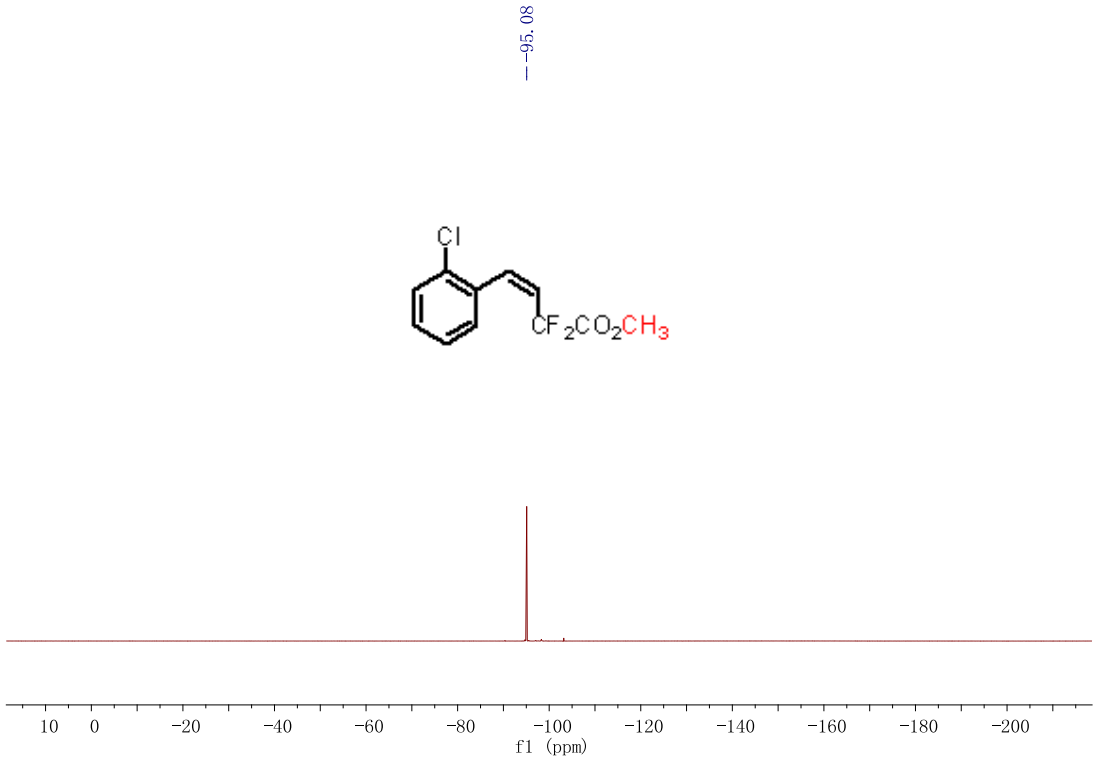
110.08
53.30
Cl
CF2CO2CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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Cl
CF2CO2CH3
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0
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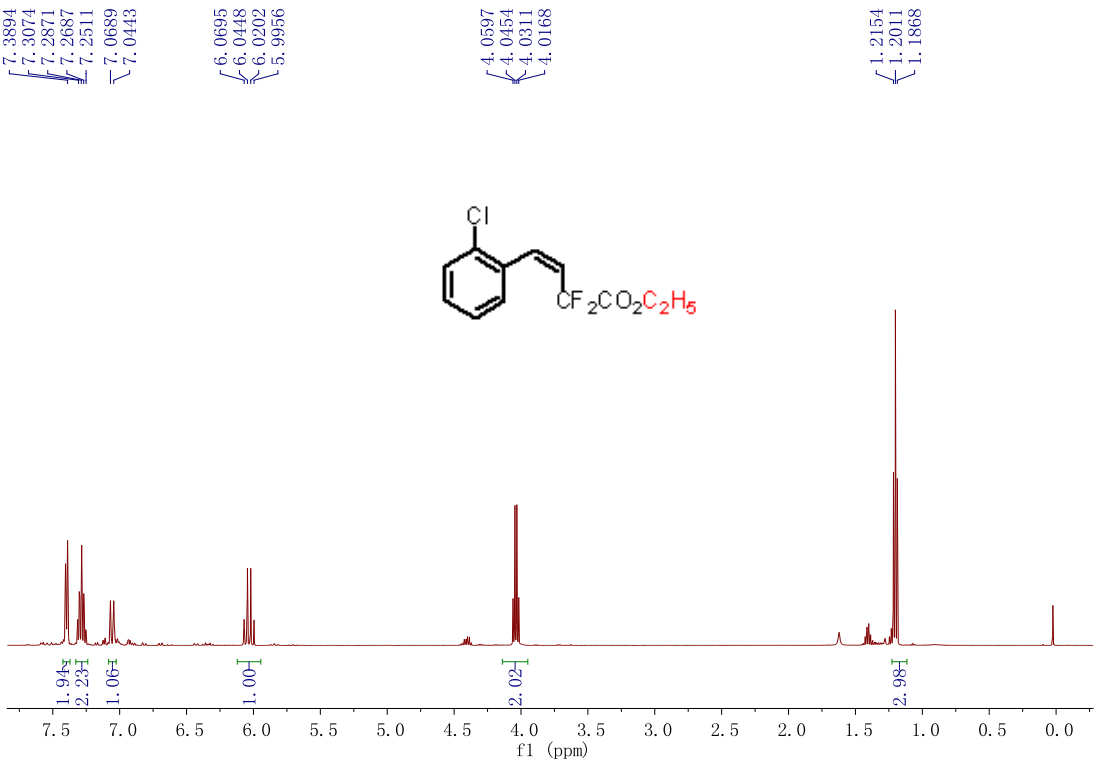
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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6.0202
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4.0597
4.0454
4.0311
4.0168
1.2154
1.2011
1.1868
Cl
CF2CO2C2H5
1.94
2.23
1.06
1.00
2.02
2.98
7.5
7.0
6.5
6.0
5.5
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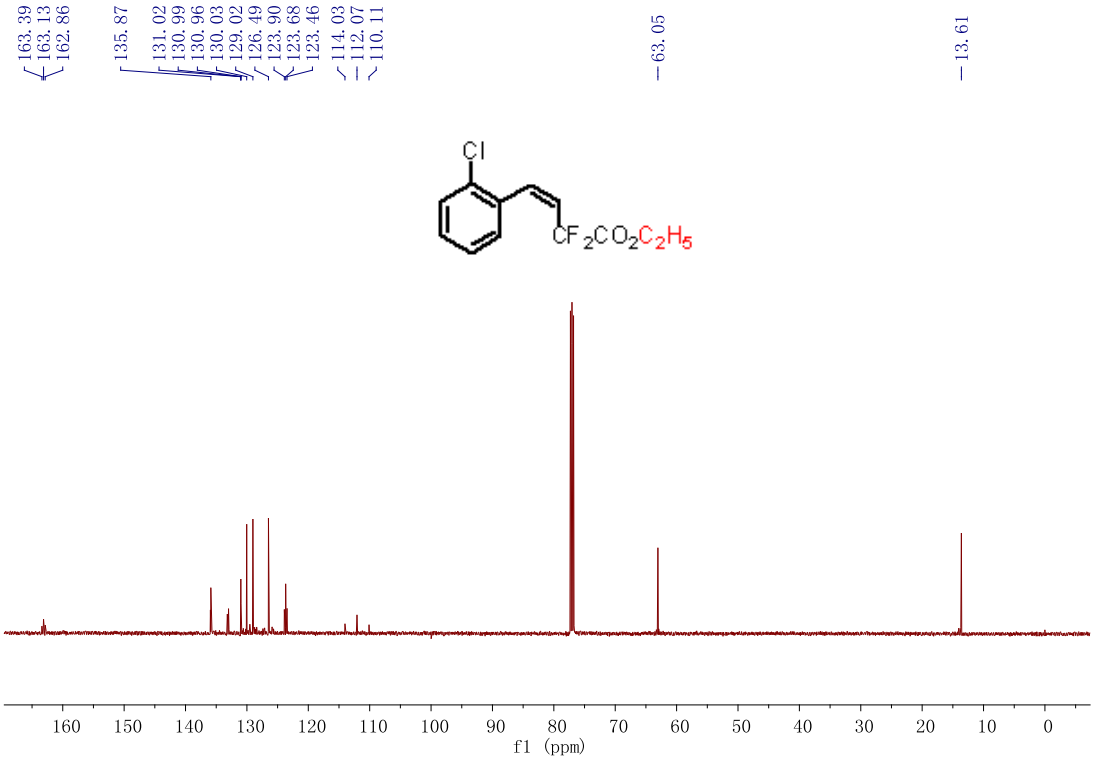
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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126.49
123.90
123.68
123.46
114.03
112.07
110.11
63.05
13.61
Cl
CF2CO2C2H5
160
150
140
130
120
110
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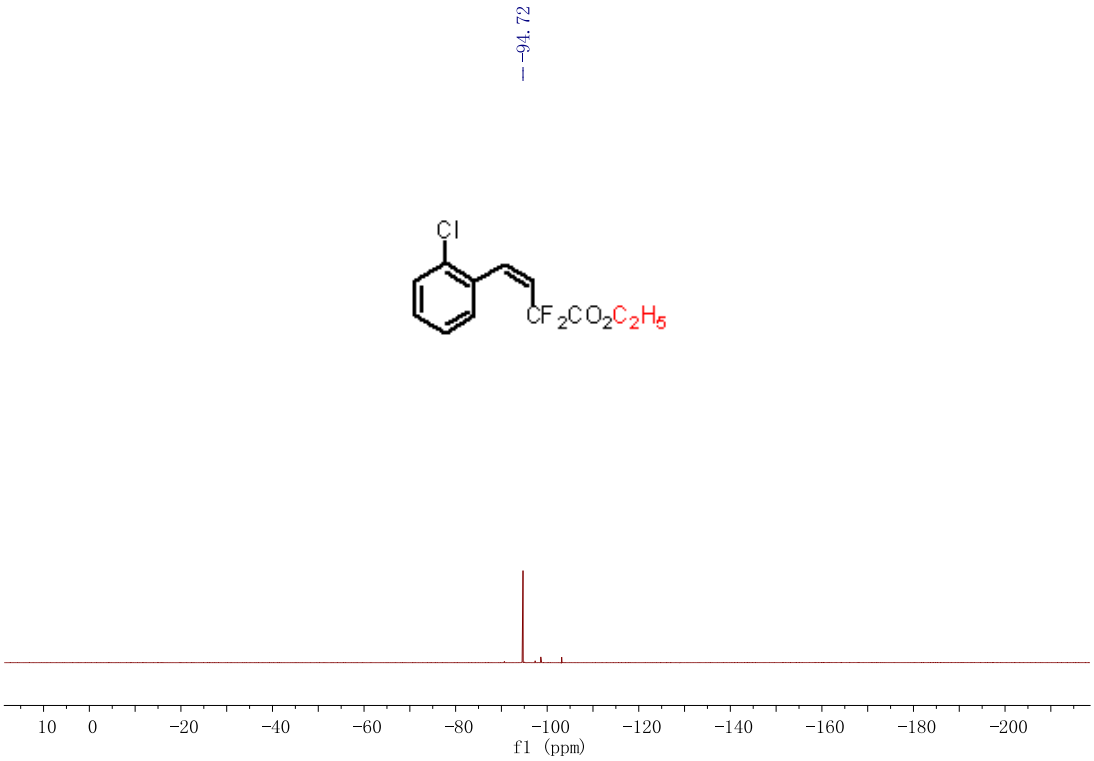
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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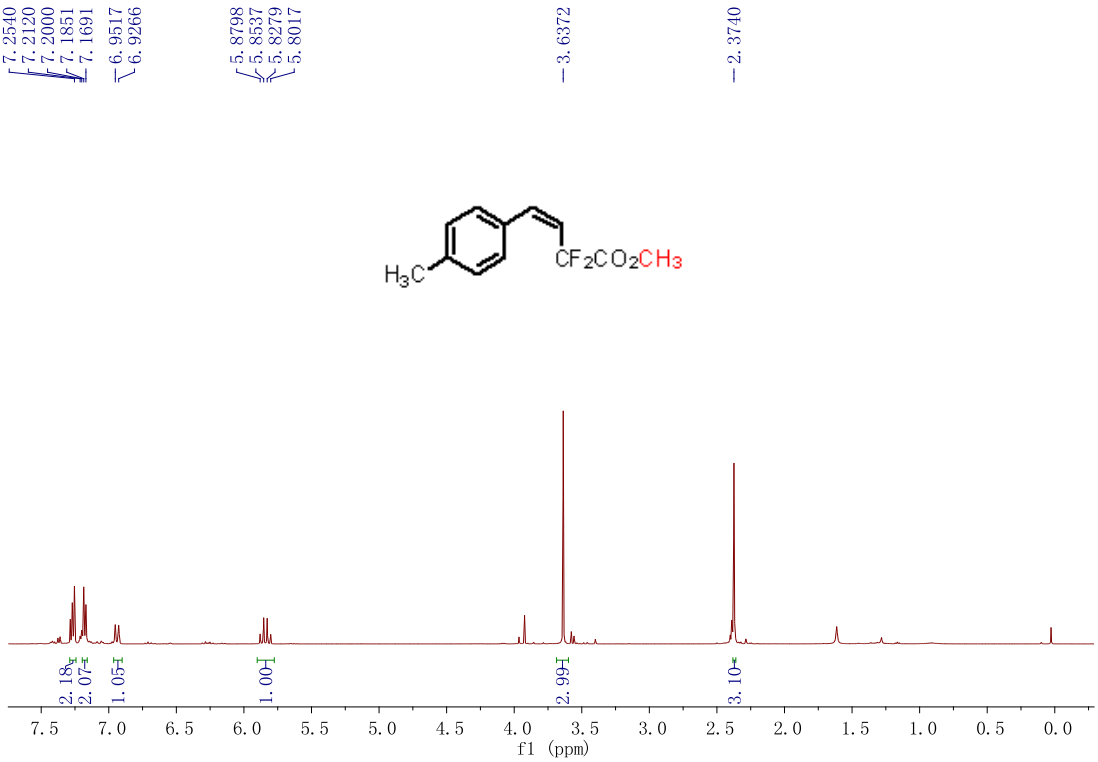
-200
f1 (ppm)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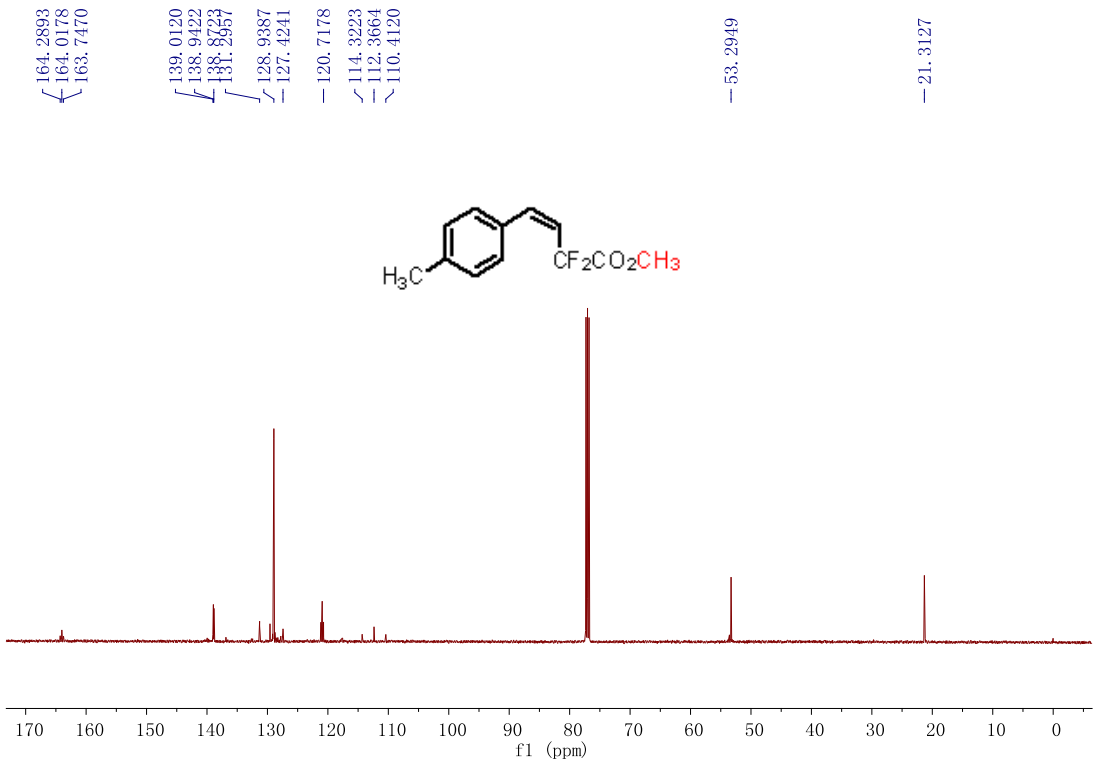
7.2120
7.2000
7.1851
7.1691
6.9517
6.9266
5.8798
5.8537
5.8279
5.8017
3.6372
2.3740
H3C
CF2CO2CH3
2.18
2.07
1.05
1.00
2.99
3.10
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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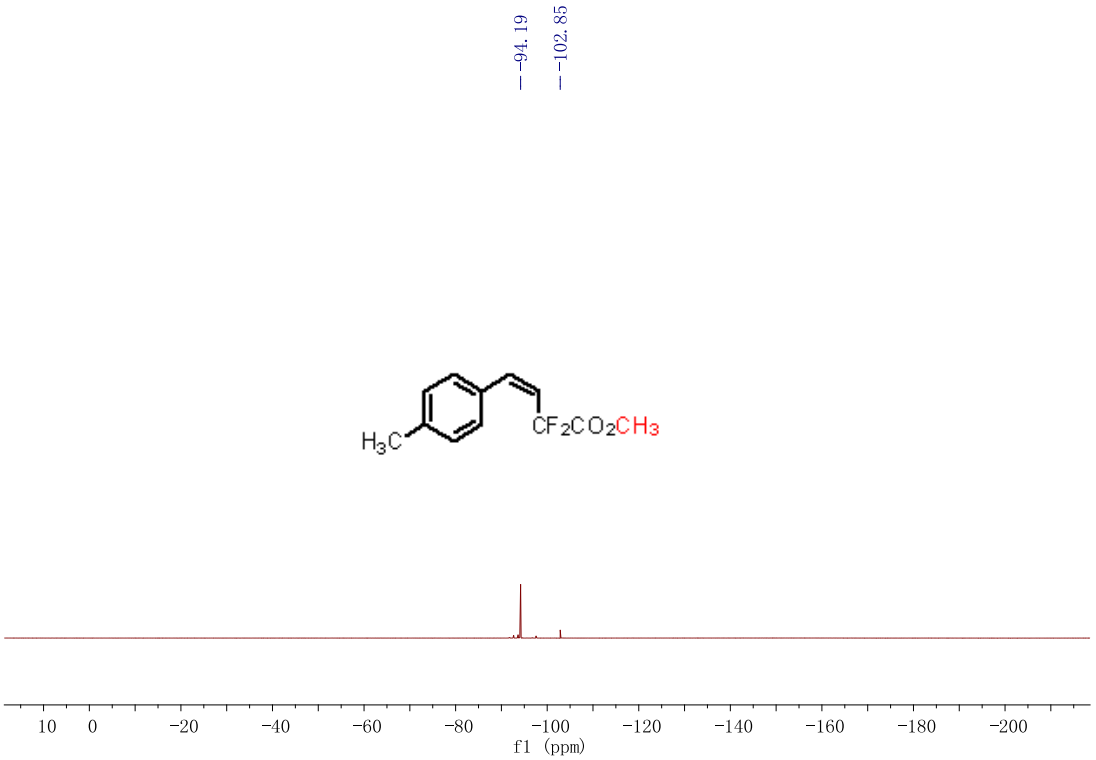
163.7470
139.0120
138.9422
138.8723
131.2957
128.9387
127.4241
120.7178
114.3223
112.3664
110.4120
53.2949
21.3127
H3C
CF2CO2CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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H3C
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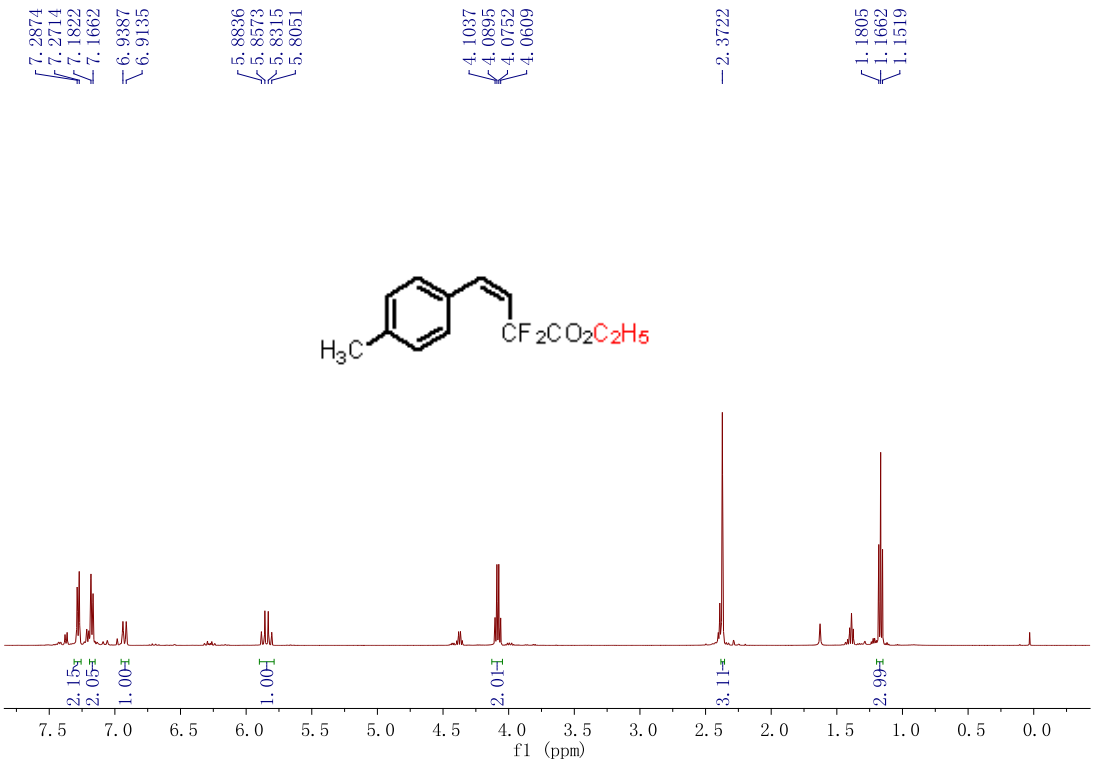
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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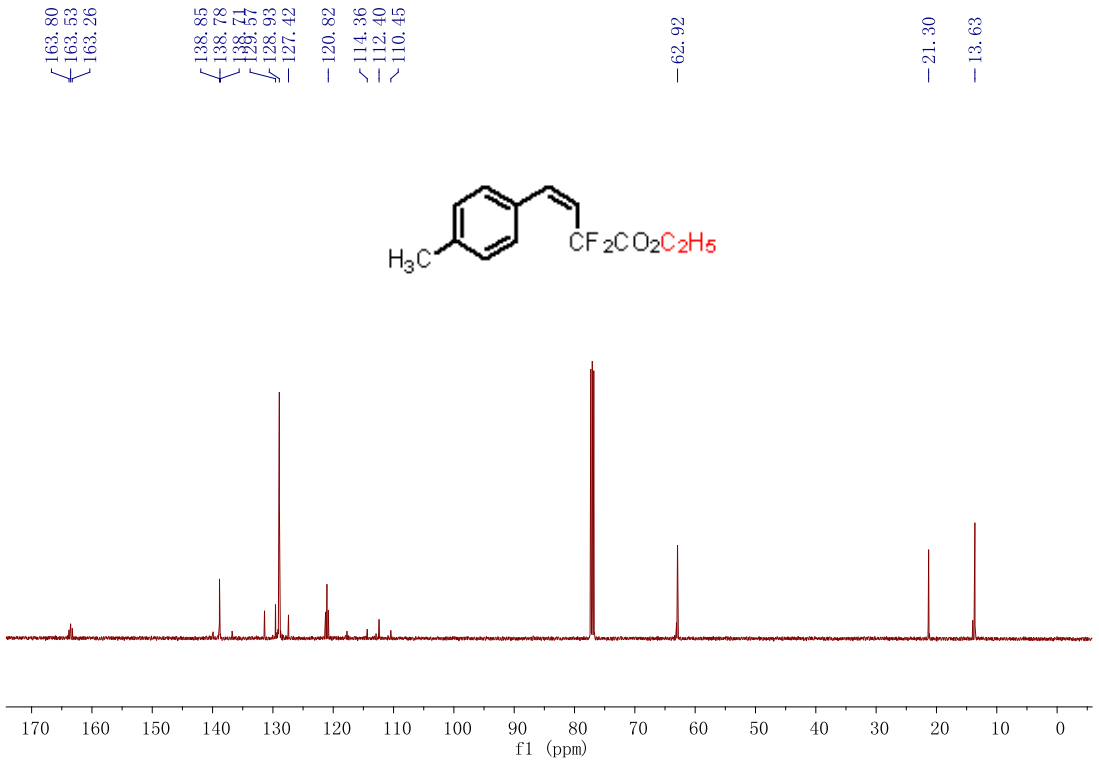
7.1822
7.1662
6.9387
6.9135
5.8836
5.8573
5.8315
5.8051
4.1037
4.0895
4.0752
4.0609
2.3722
1.1805
1.1662
1.1519
H3C
CF2CO2C2H5
2.15
2.05
1.00
1.00
2.01
3.11
2.99
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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163.53
163.26
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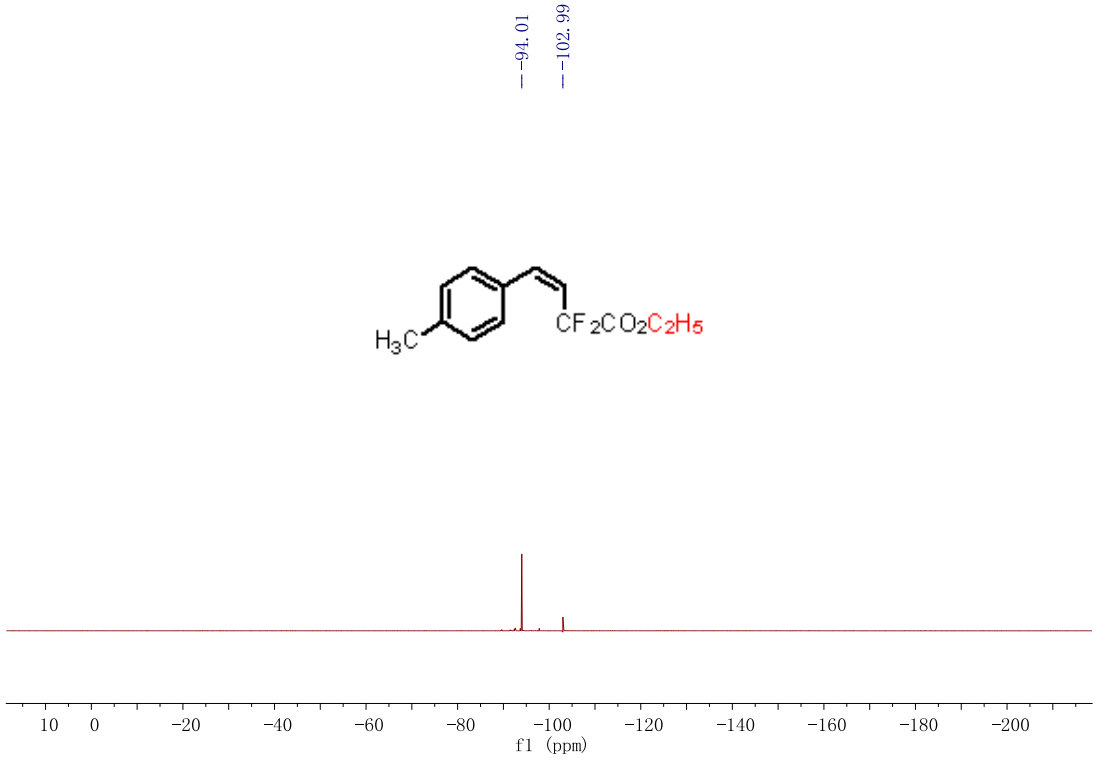
138.78
129.57
128.93
127.42
120.82
114.36
112.40
110.45
62.92
21.30
13.63
H3C
CF2CO2C2H5
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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-102.99
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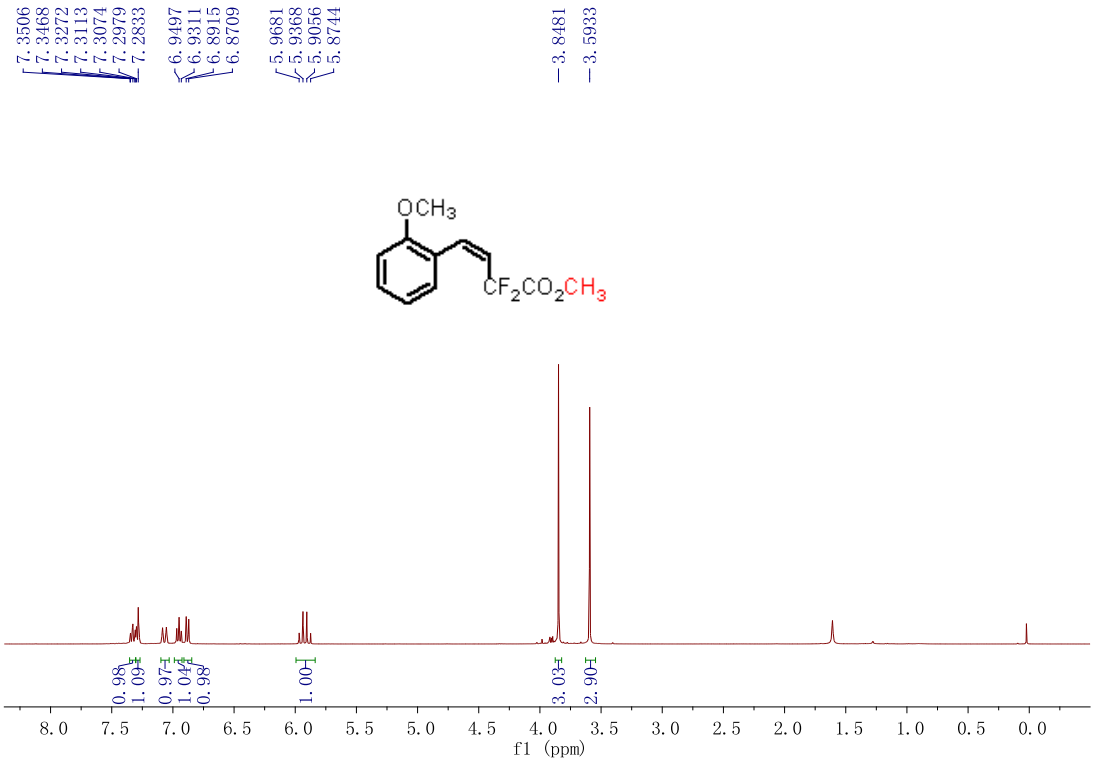
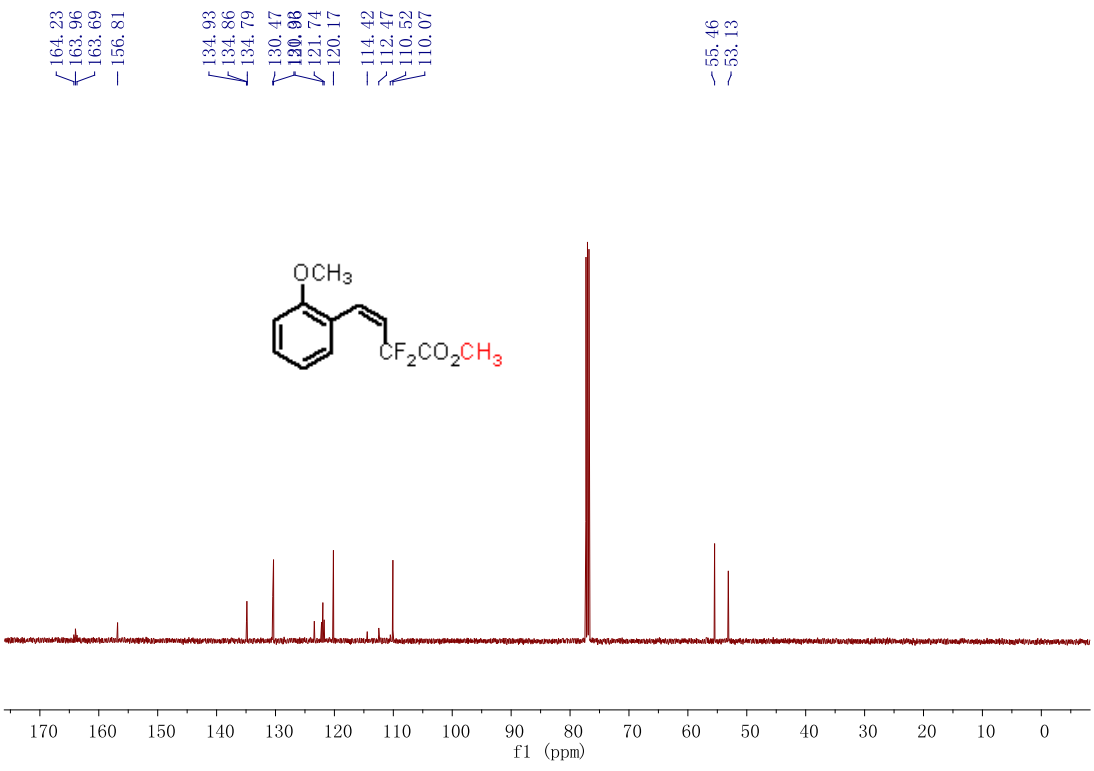
f1 (ppm)


7.3506
7.3468
7.3272
7.3113
7.3074
7.2979
7.2833
6.9497
6.9311
6.8915
6.8709
5.9681
5.9368
5.9056
5.8744
3.8481
3.5933
OCH3
CF2CO2CH3
0.98
1.09
0.97
1.04
0.98
1.00
3.03
2.90
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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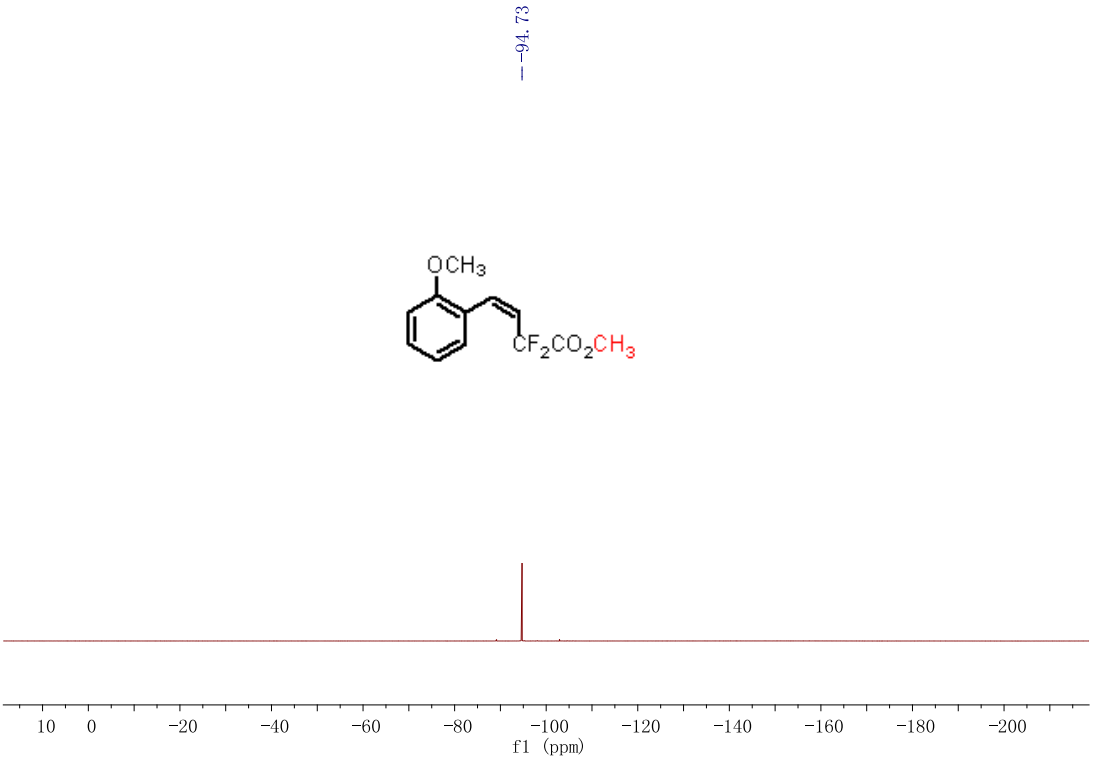
163.96
163.69
156.81
134.93
134.86
134.79
130.47
121.74
120.17
114.42
112.47
110.52
110.07
55.46
53.13
OCH3
CF2CO2CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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OCH3
CF2CO2CH3
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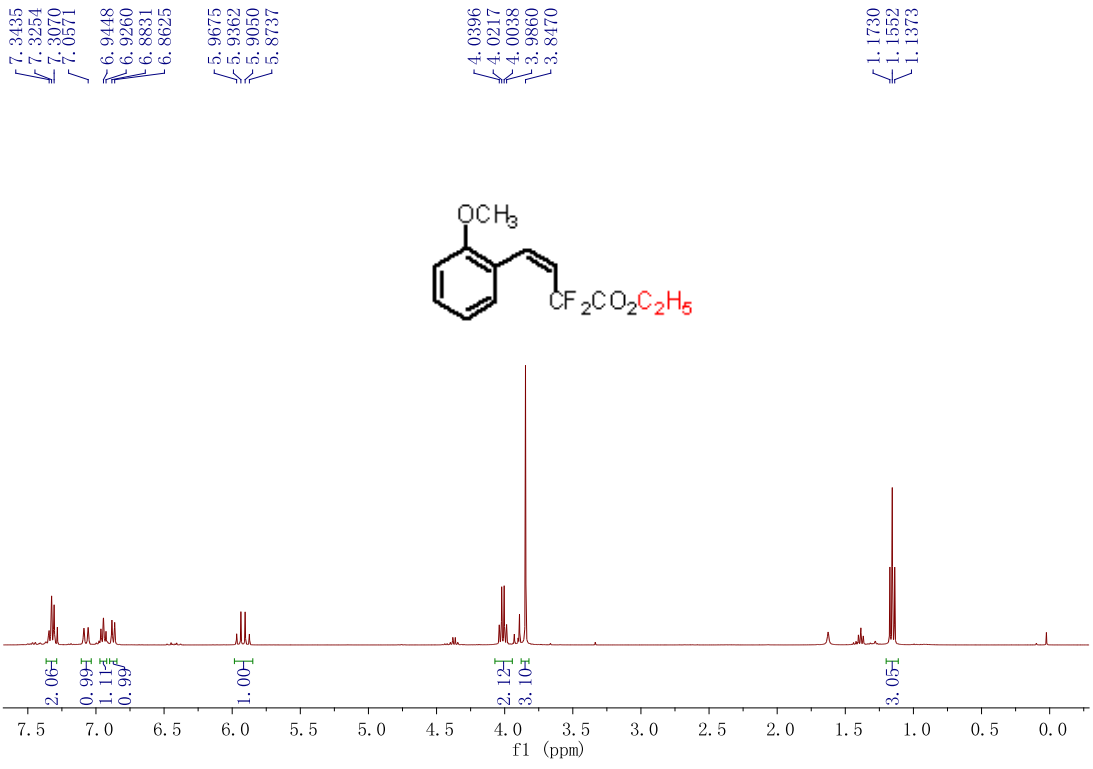
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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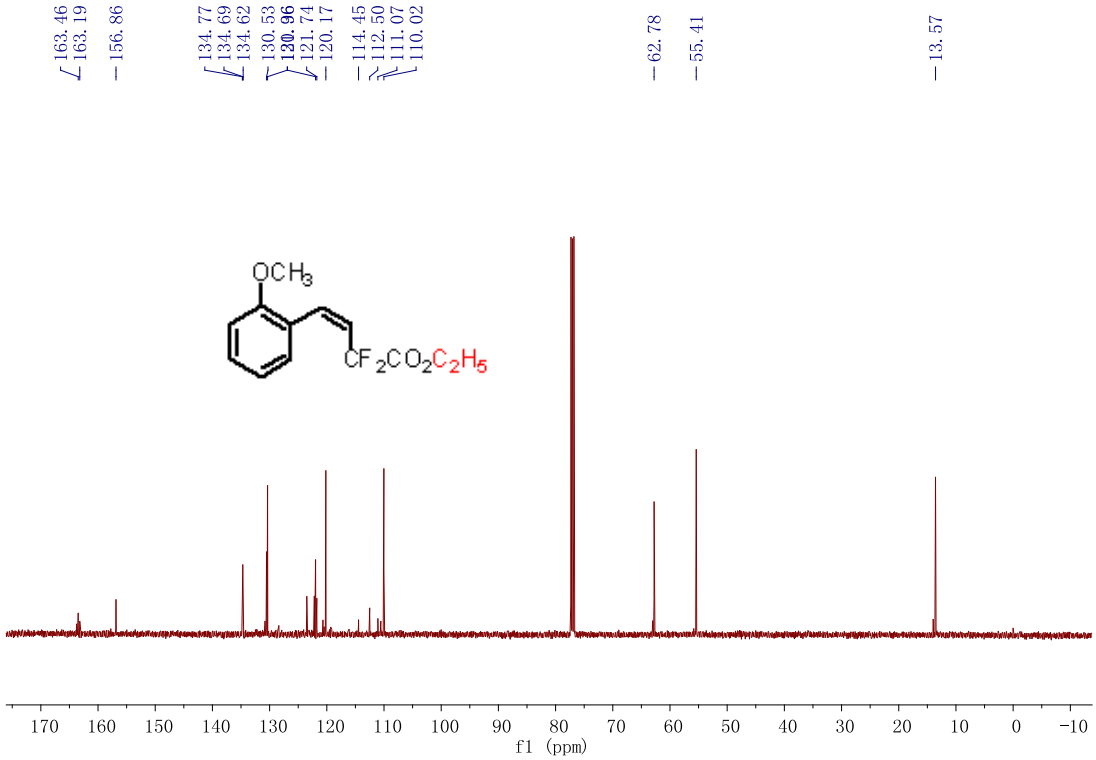
7.3254
7.3070
7.0571
6.9448
6.9260
6.8831
6.8625
5.9675
5.9362
5.9050
5.8737
4.0396
4.0217
4.0038
3.9860
3.8470
1.1730
1.1552
1.1373
OCH3
CF2CO2C2H5
2.06
0.99
1.11
0.99
1.00
2.12
3.10
3.05
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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156.86
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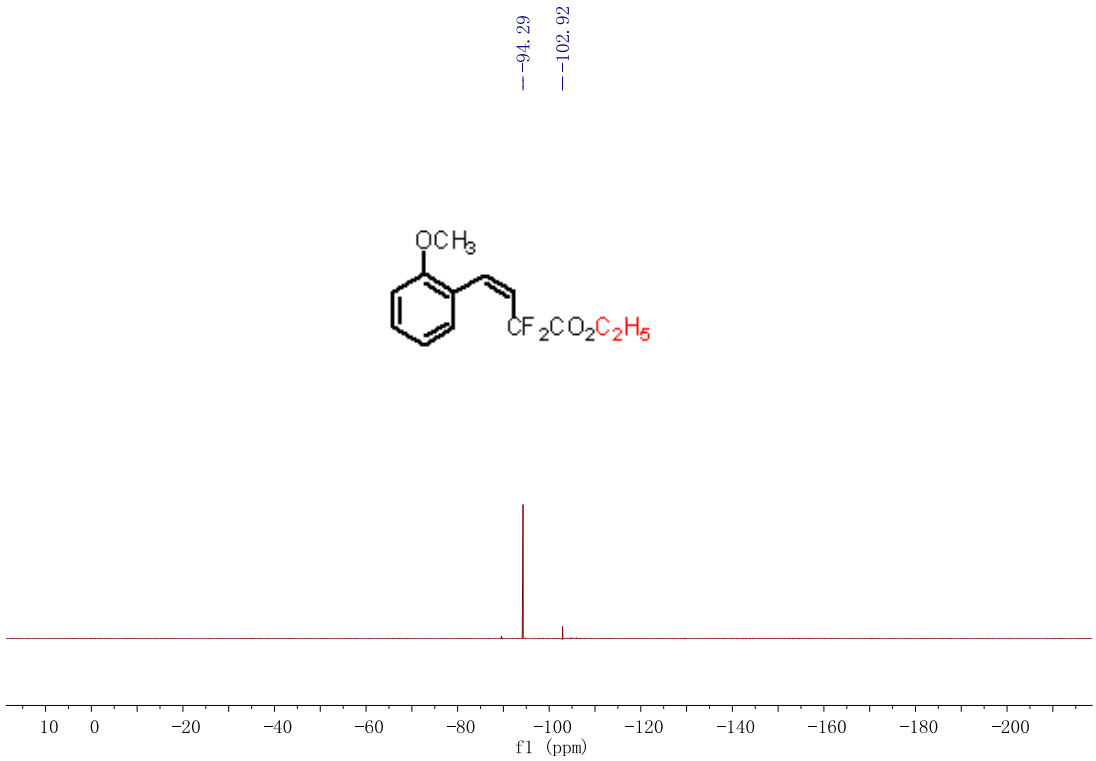
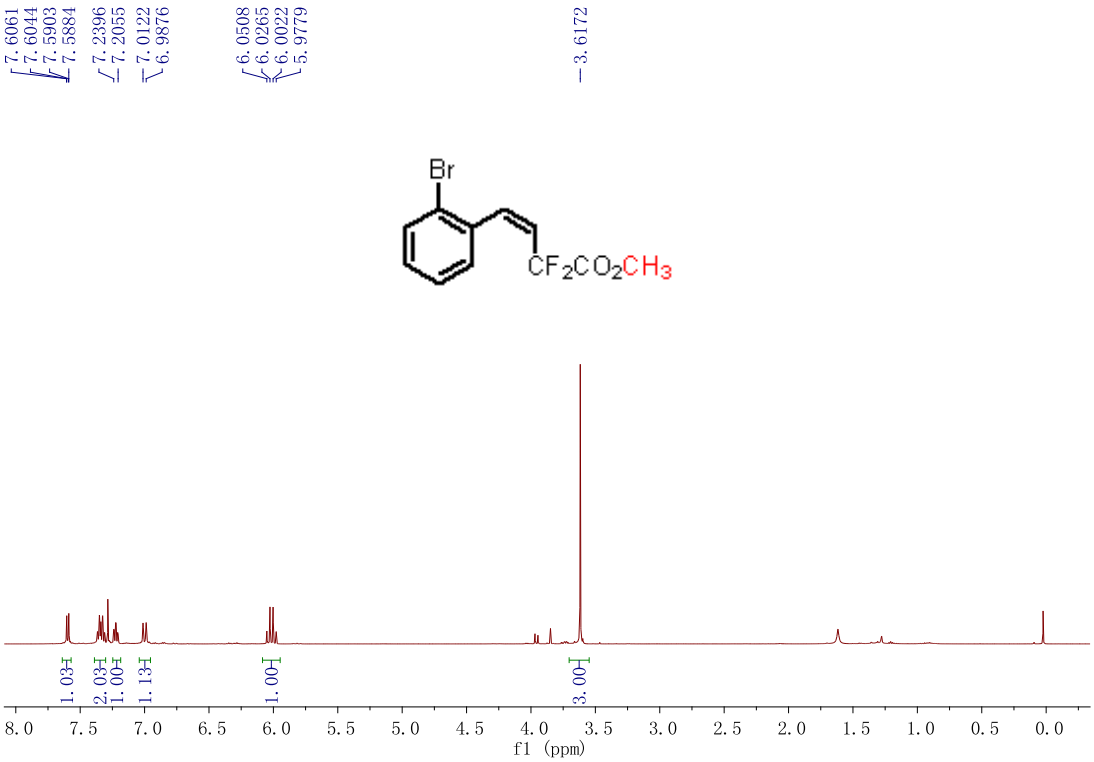
130.53
130.96
121.74
120.17
114.45
112.50
111.07
110.02
62.78
55.41
13.57
OCH3
CF2CO2C2H5
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 −10
f1 (ppm)


−94.29
−102.92
OCH3
CF2CO2C2H5
10 0 −20 −40 −60 −80 −100 −120 −140 −160 −180 −200
f1 (ppm)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7.5903
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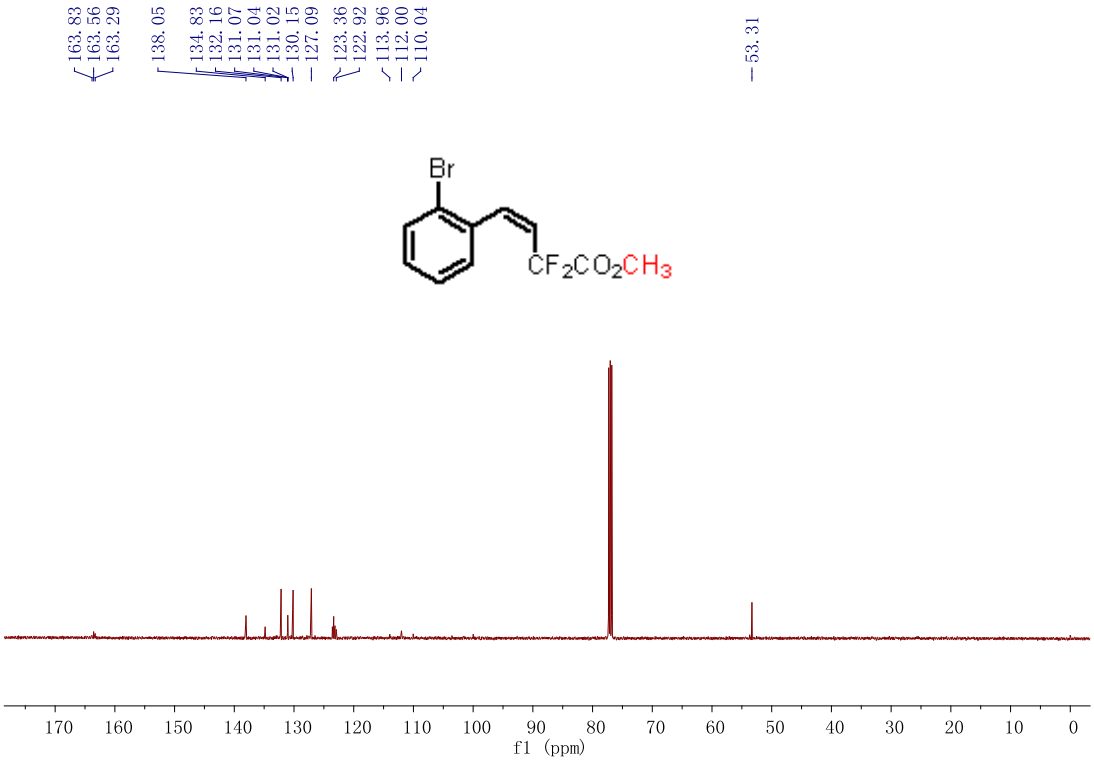
7.2396
7.2055
7.0122
6.9876
6.0508
6.0265
6.0022
5.9779
3.6172
Br
CF2CO2CH3
1.03
2.03
1.00
1.13
1.00
3.00
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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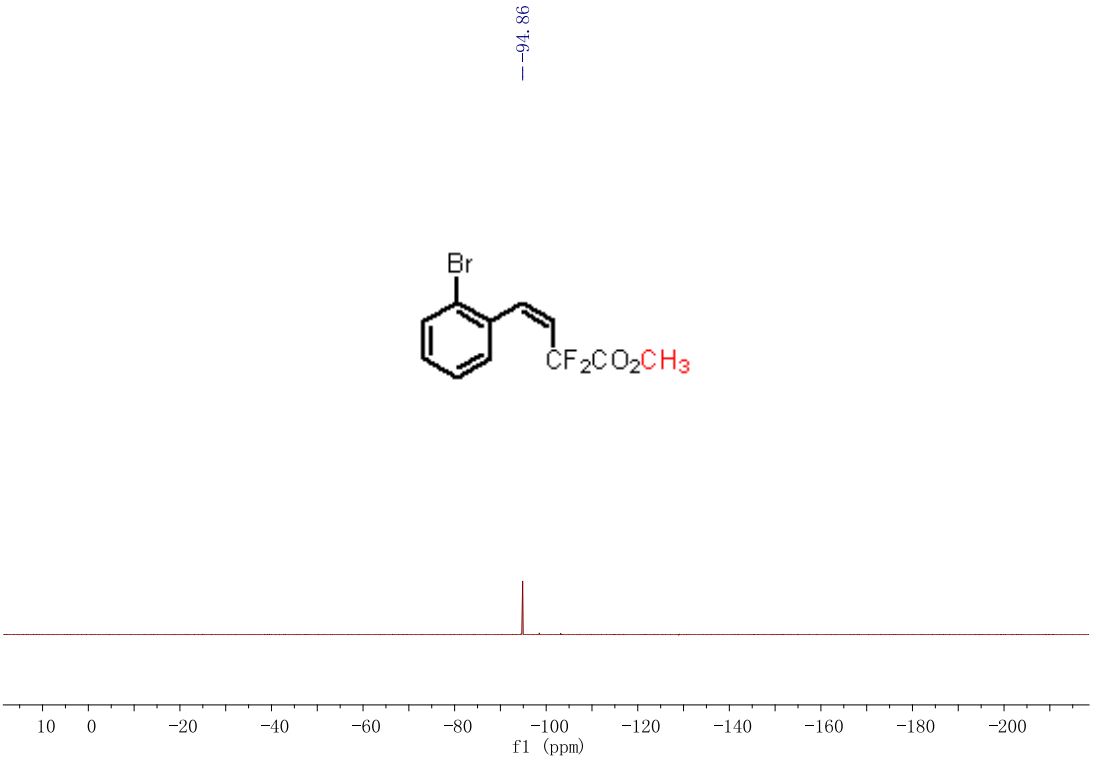
134.83
132.16
131.07
131.04
131.02
130.15
127.09
123.36
122.92
113.96
112.00
110.04
53.31
Br
CF2CO2CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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Br
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0
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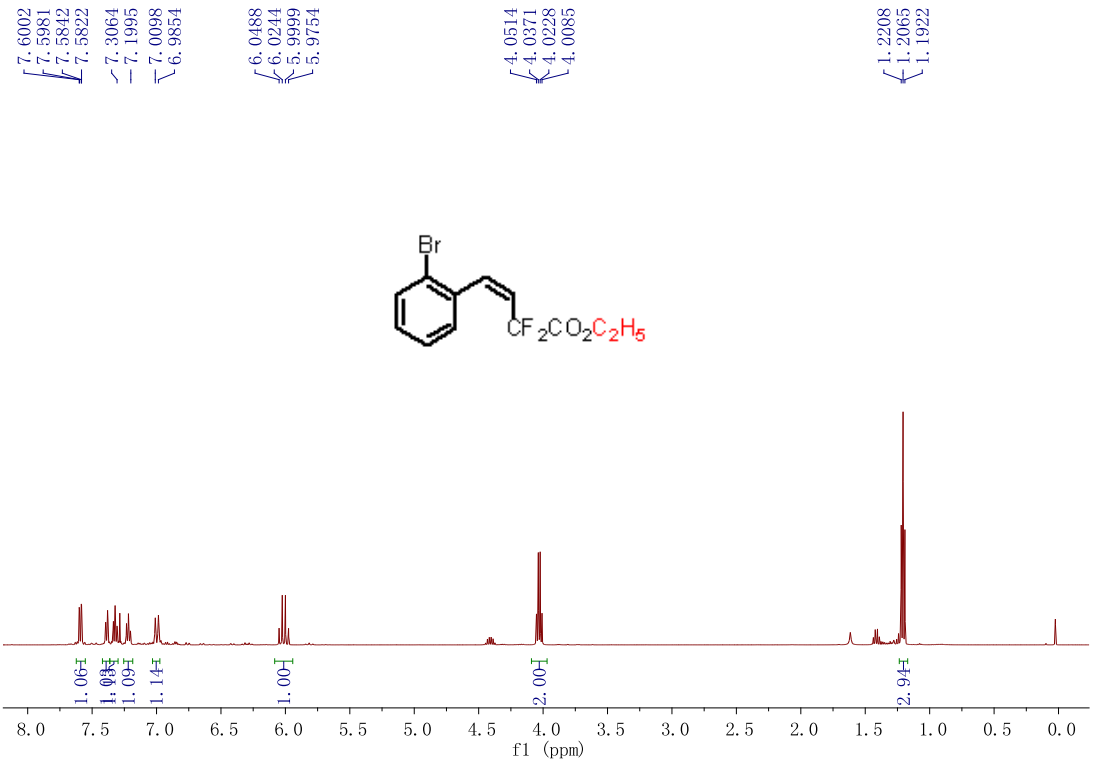
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.5822
7.3064
7.1995
7.0098
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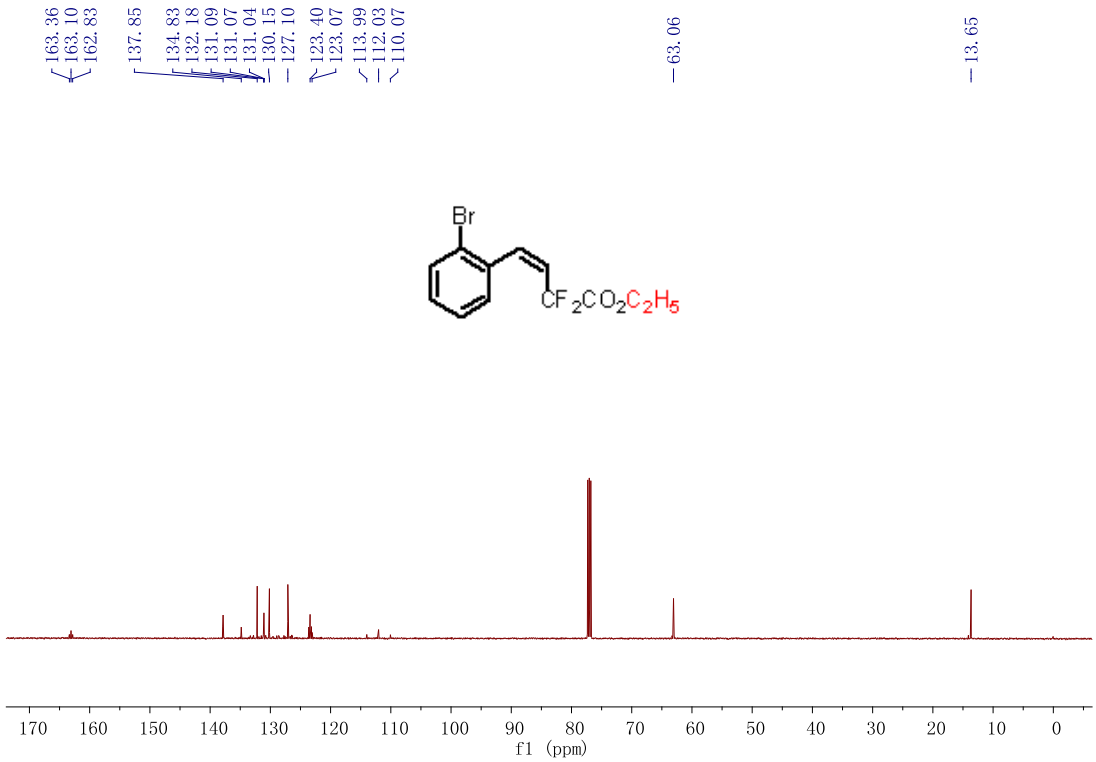
6.0488
6.0244
5.9999
5.9754
4.0514
4.0371
4.0228
4.0085
1.2208
1.2065
1.1922
Br
CF2CO2C2H5
1.06
1.14
1.00
2.00
2.94
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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131.07
131.04
130.15
127.10
123.40
123.07
113.99
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110.07
63.06
13.65
Br
CF2CO2C2H5
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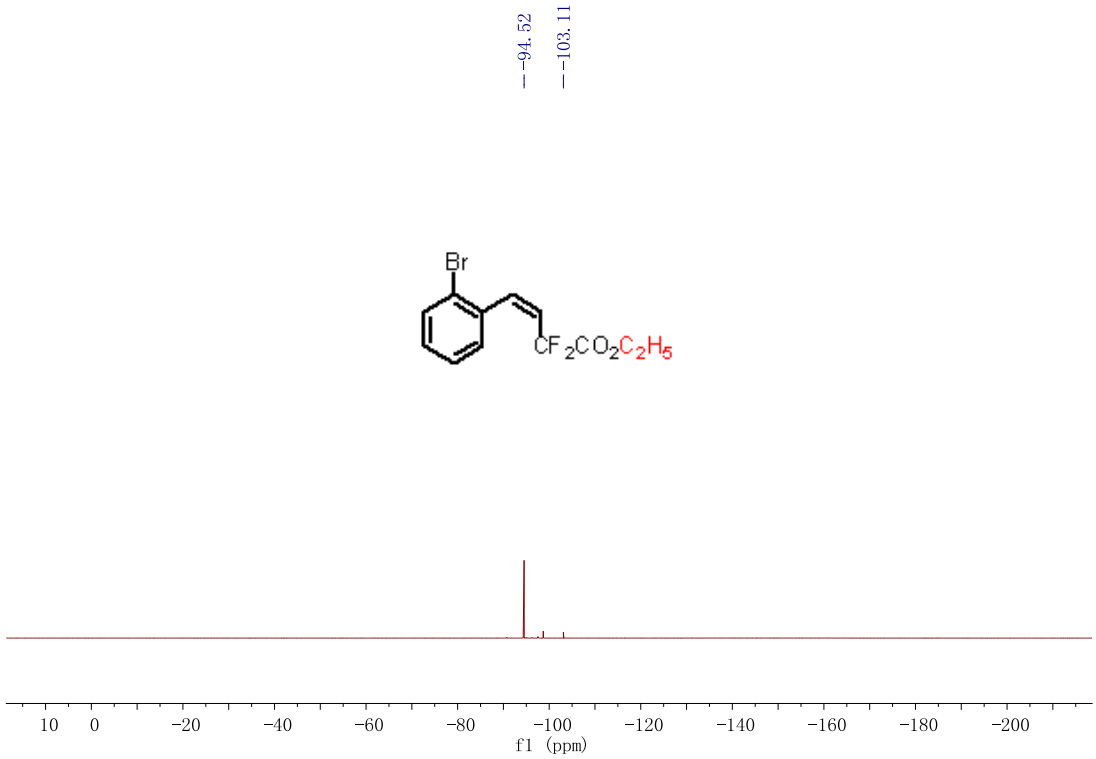
f1 (ppm)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-103.11
Br
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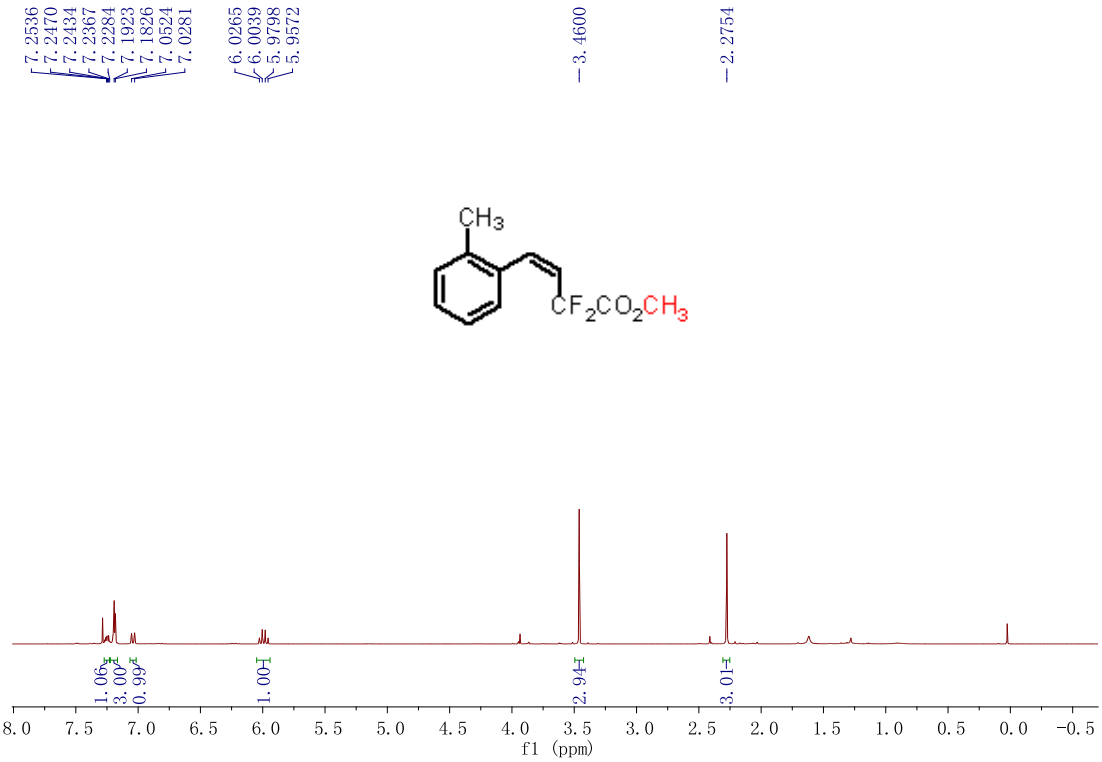
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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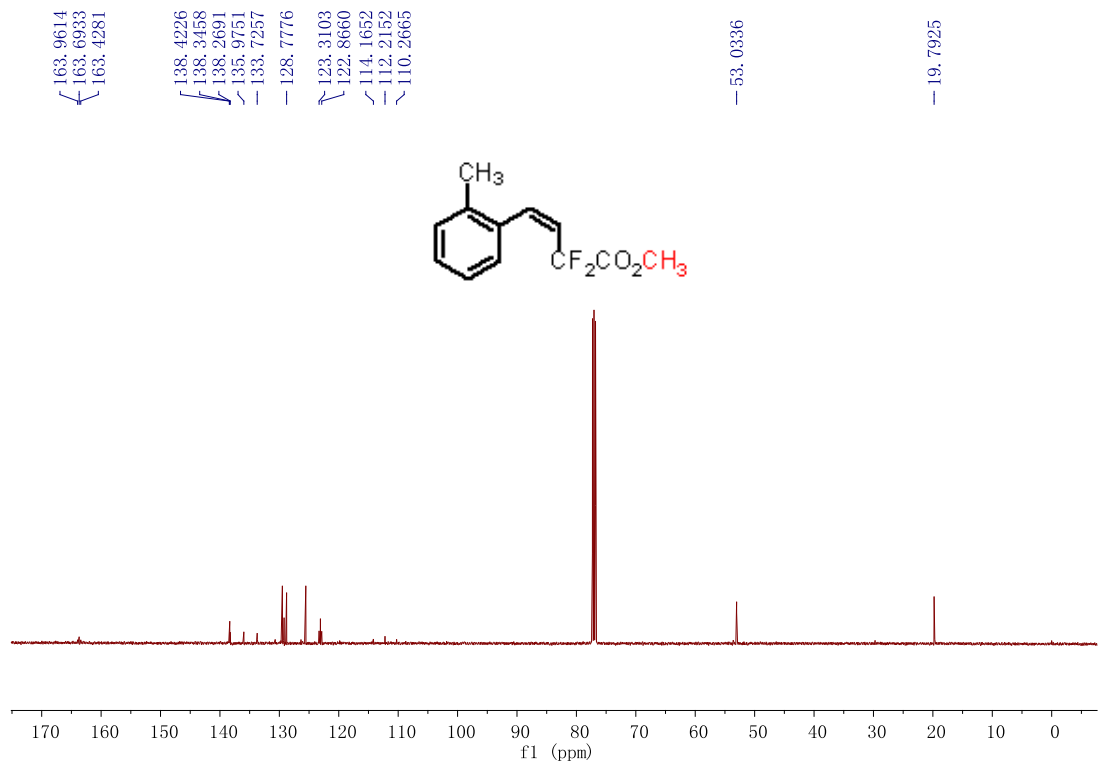
7.1923
7.1826
7.0524
7.0281
6.0265
6.0039
5.9798
5.9572
3.4600
2.2754
CH3
CF2CO2CH3
1.06
3.00
0.99
1.00
2.94
3.01
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 −0.5
f1 (ppm)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128.7776
123.3103
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114.1652
112.2152
110.2665
53.0336
19.7925
CH3
CF2CO2CH3
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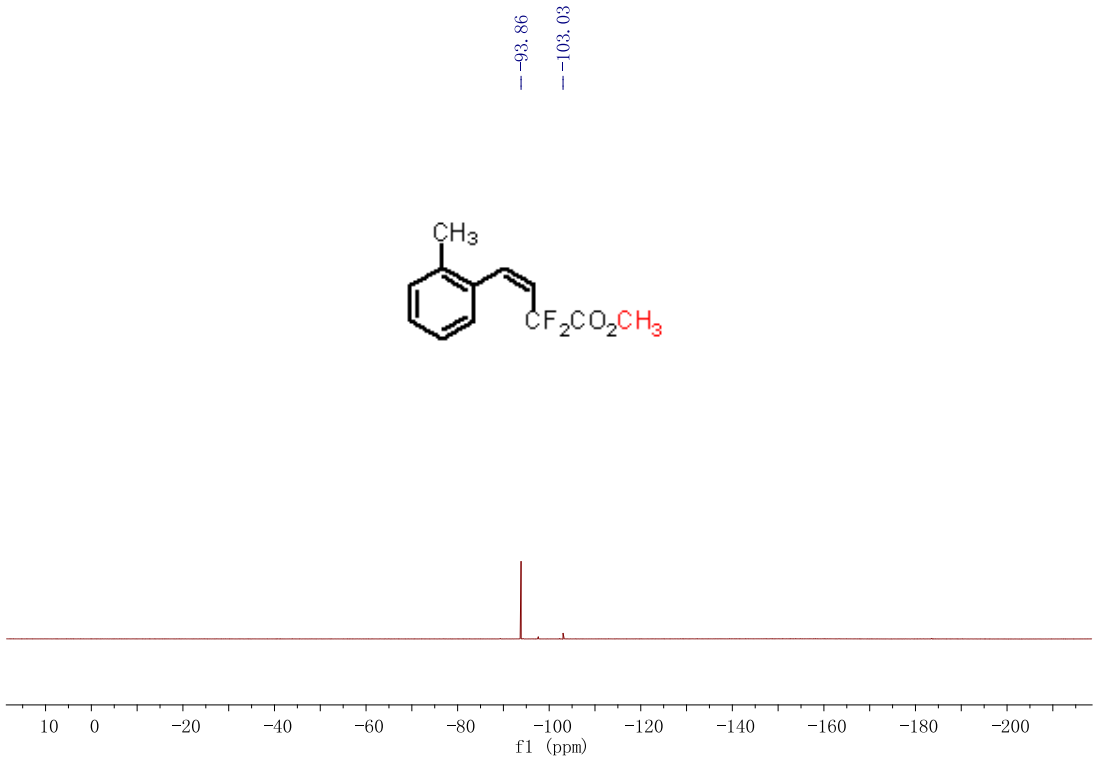
f1 (ppm)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CH3
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10
0
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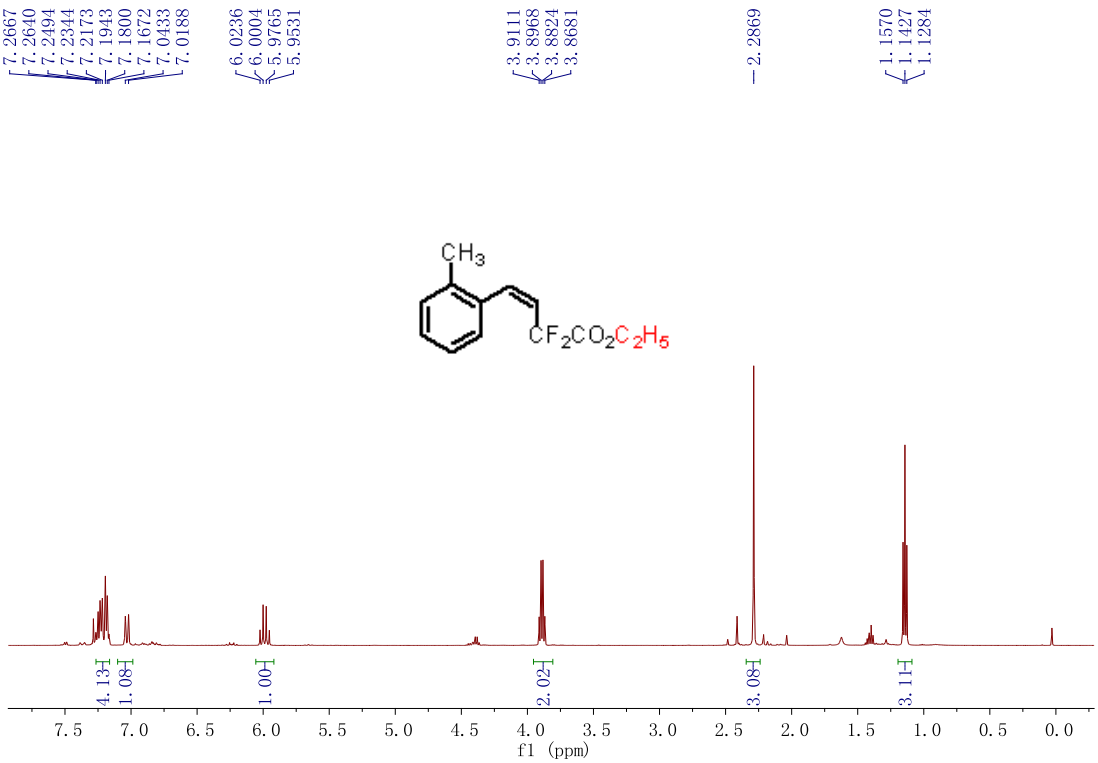
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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7.1943
7.1800
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7.0433
7.0188
6.0236
6.0004
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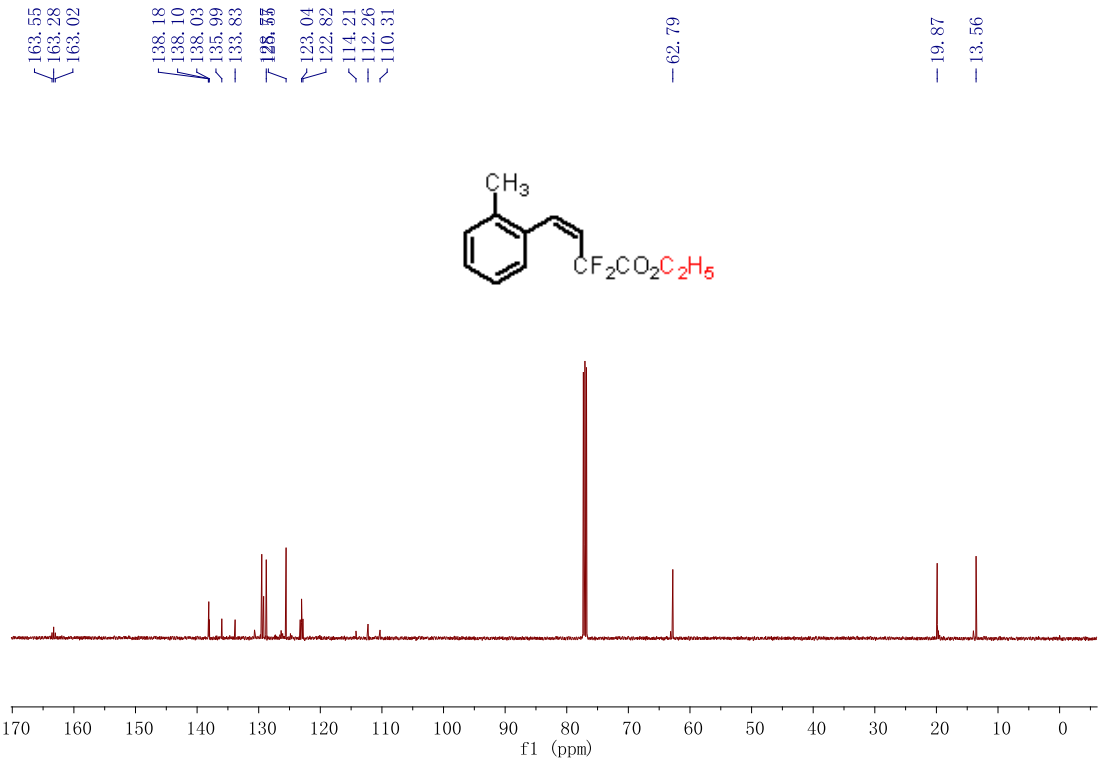
3.9111
3.8968
3.8824
3.8681
2.2869
1.1570
1.1427
1.1284
CH3
CF2CO2C2H5
4.13H
1.08H
1.00H
2.02H
3.08H
3.11H
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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138.03
135.99
133.83
123.04
122.82
114.21
112.26
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13.56
CH3
CF2CO2C2H5
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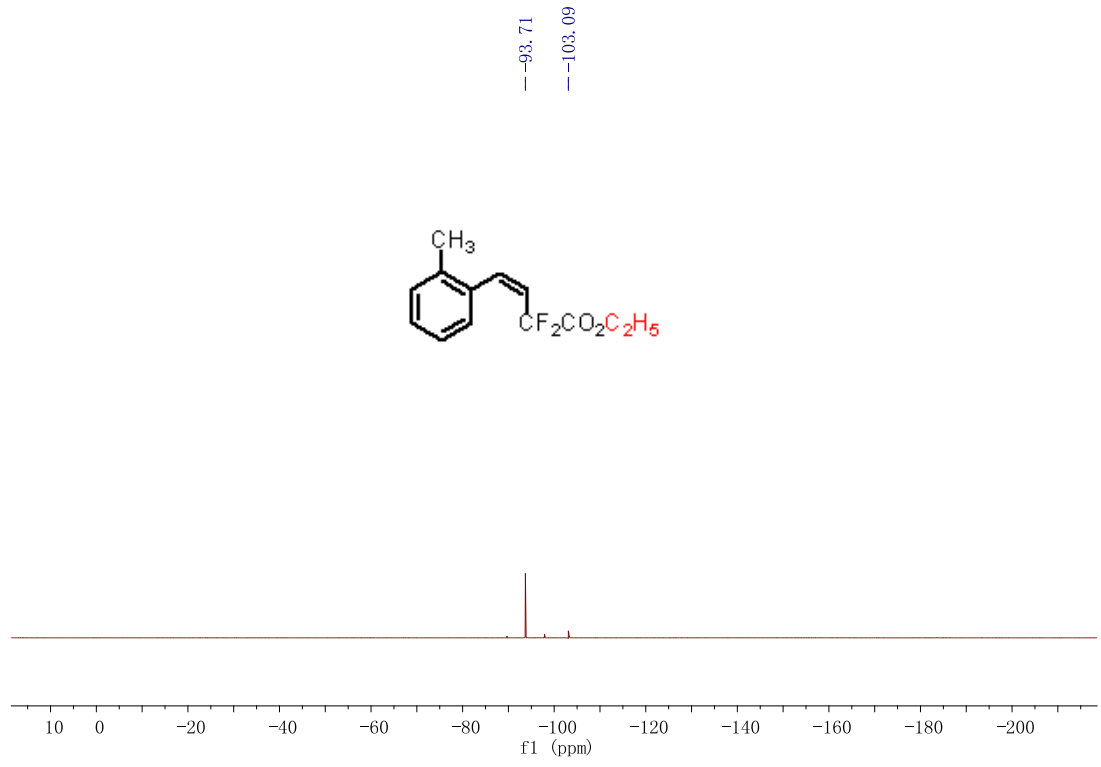
f1 (ppm)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CH3
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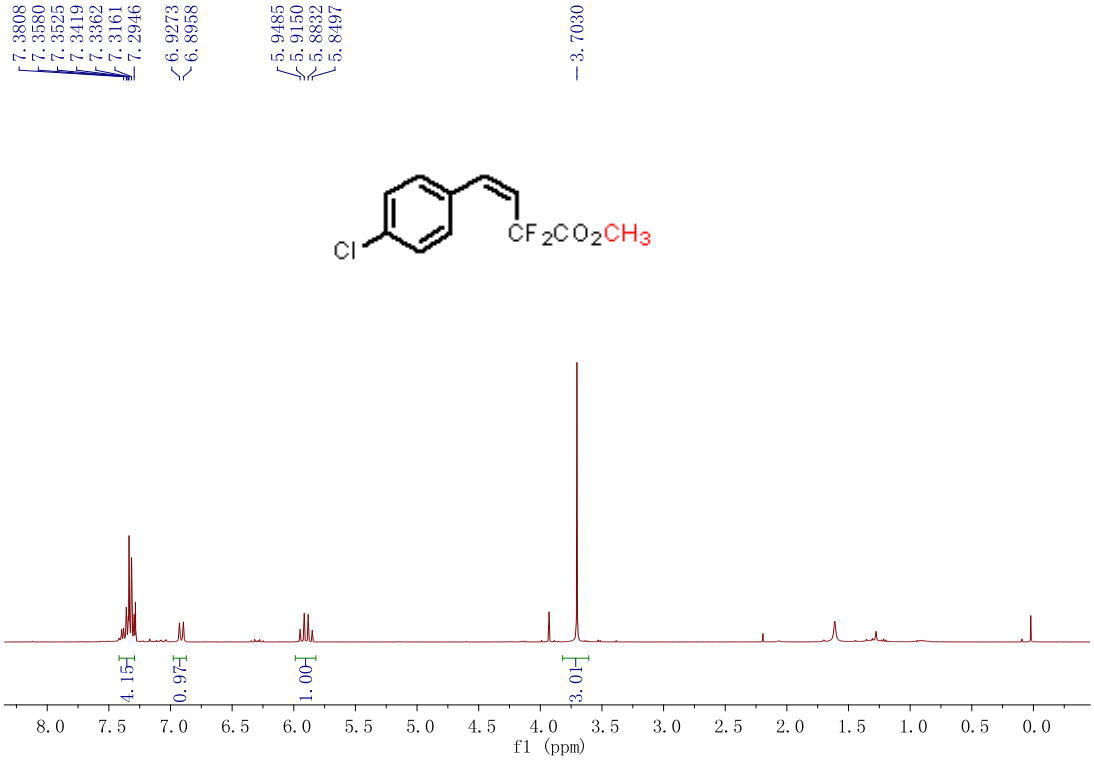
f1 (ppm)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7.3161
7.2946
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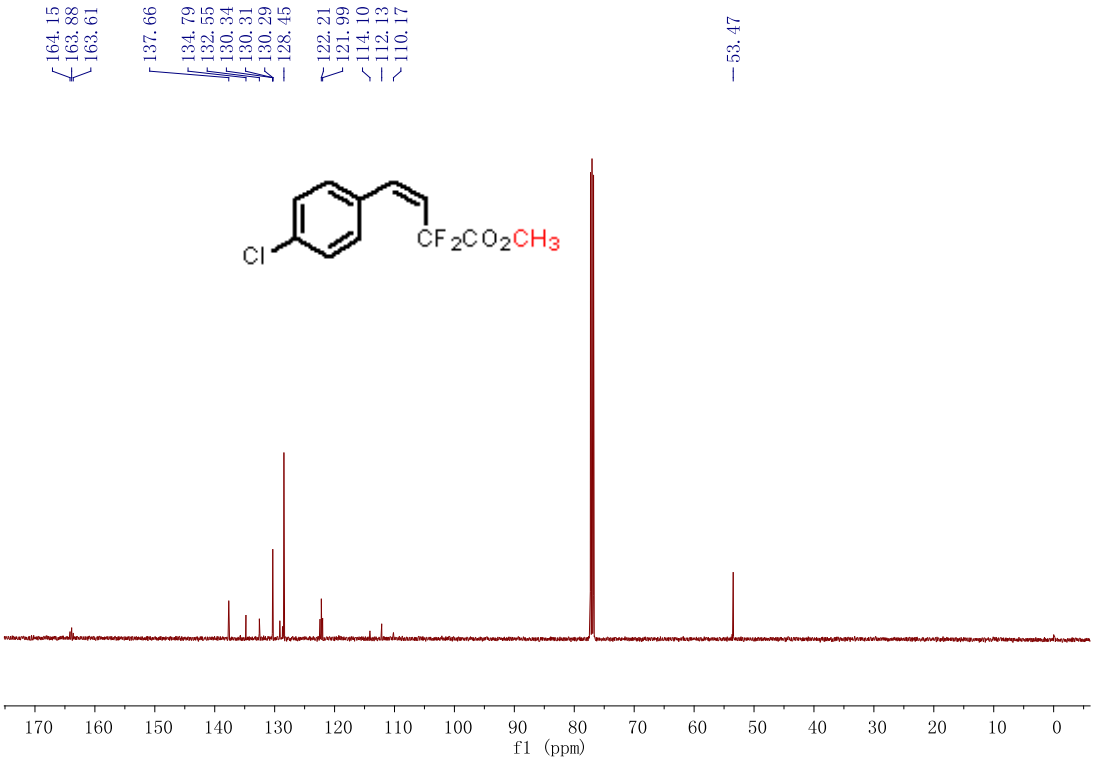
6.8958
5.9485
5.9150
5.8832
5.8497
3.7030
Cl
CF2CO2CH3
4.15
0.97
1.00
3.01
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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130.31
130.29
128.45
122.21
121.99
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112.13
110.17
53.47
Cl
CF2CO2CH3
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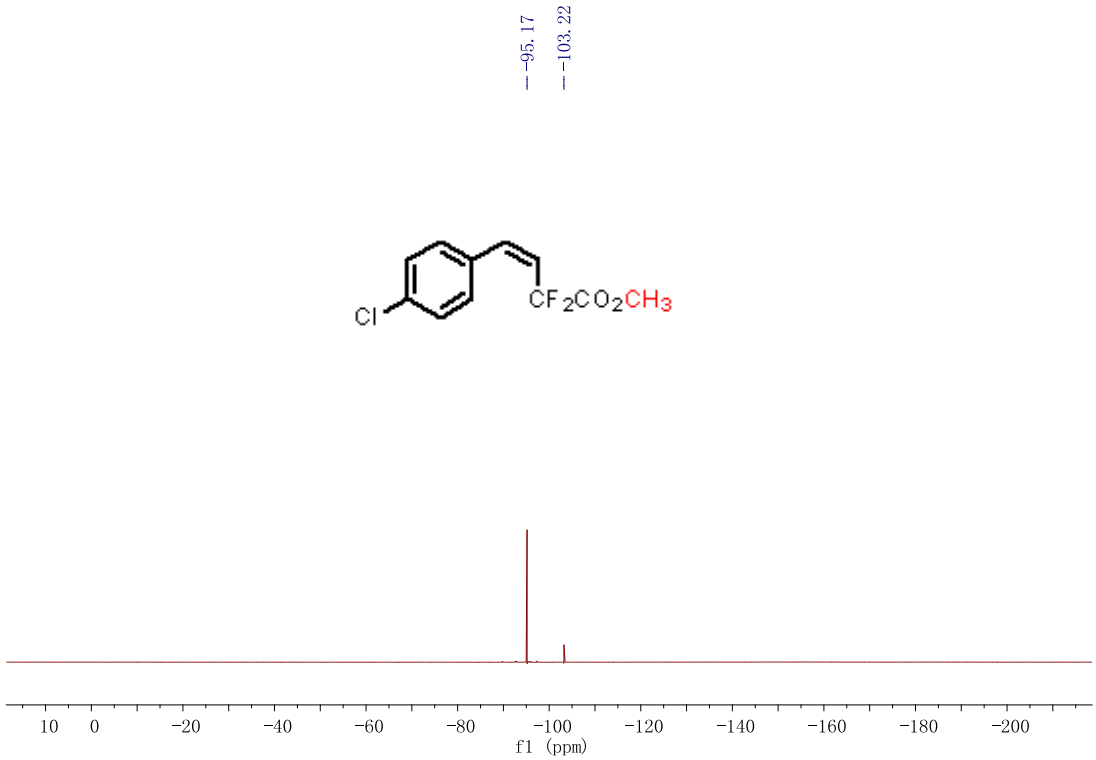
f1 (ppm)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Cl
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0
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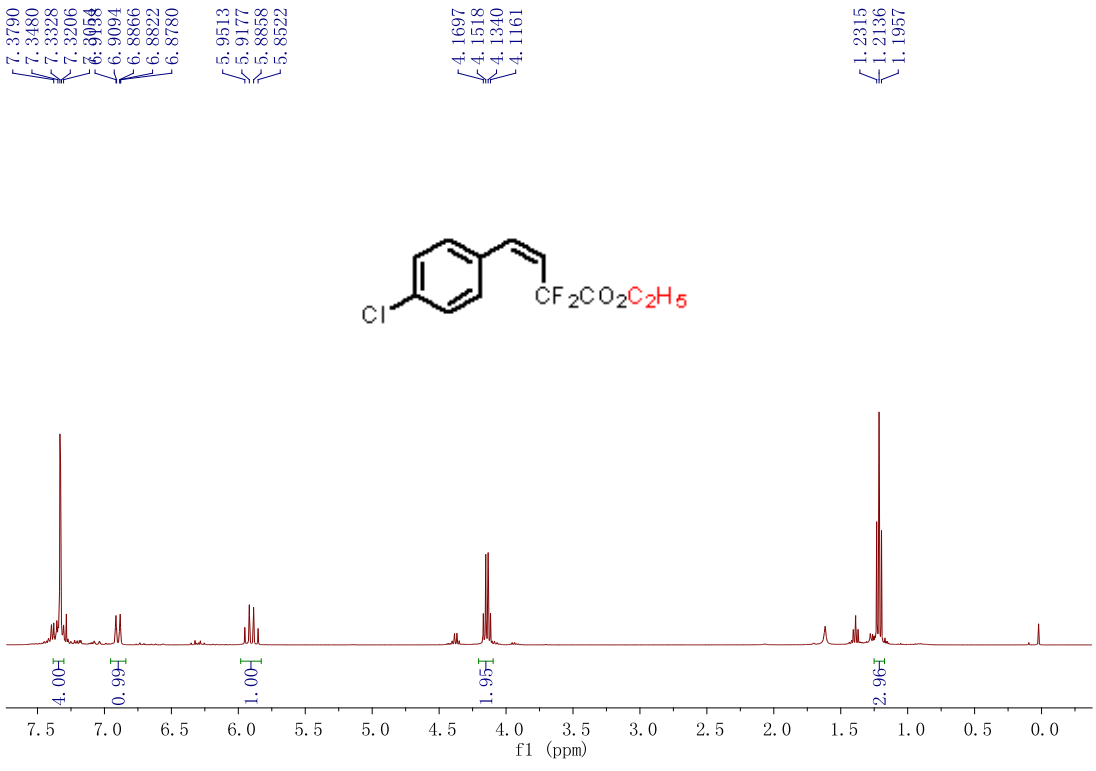
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)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6.8822
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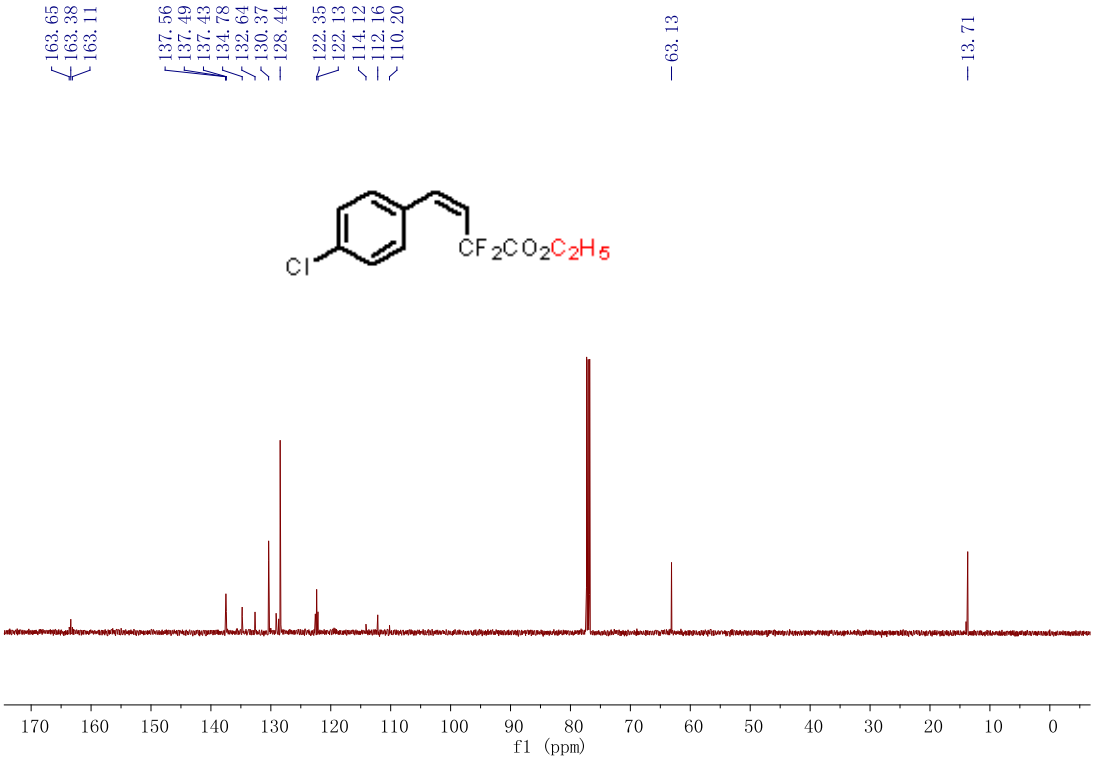
5.8858
5.8522
4.1697
4.1518
4.1340
4.1161
1.2315
1.2136
1.1957
Cl
CF2CO2C2H5
4.00
0.99
1.00
1.95
2.96
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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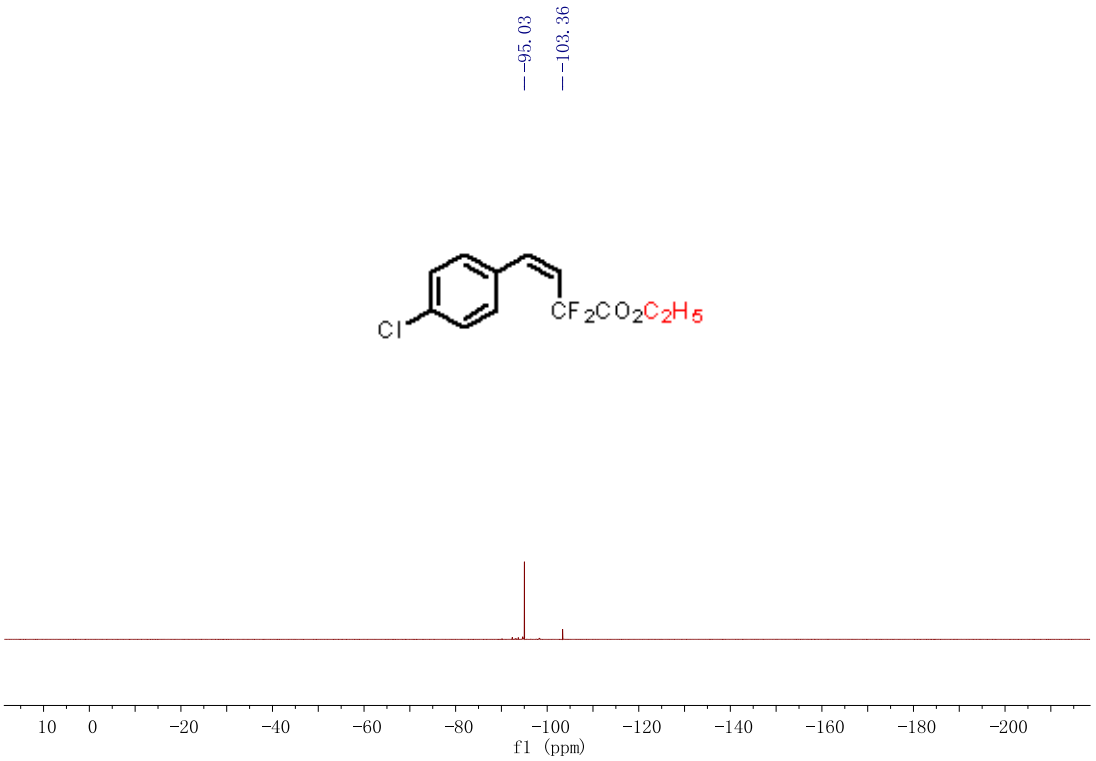
132.64
130.37
128.44
122.35
122.13
114.12
112.16
110.20
63.13
13.71
Cl
CF2CO2C2H5
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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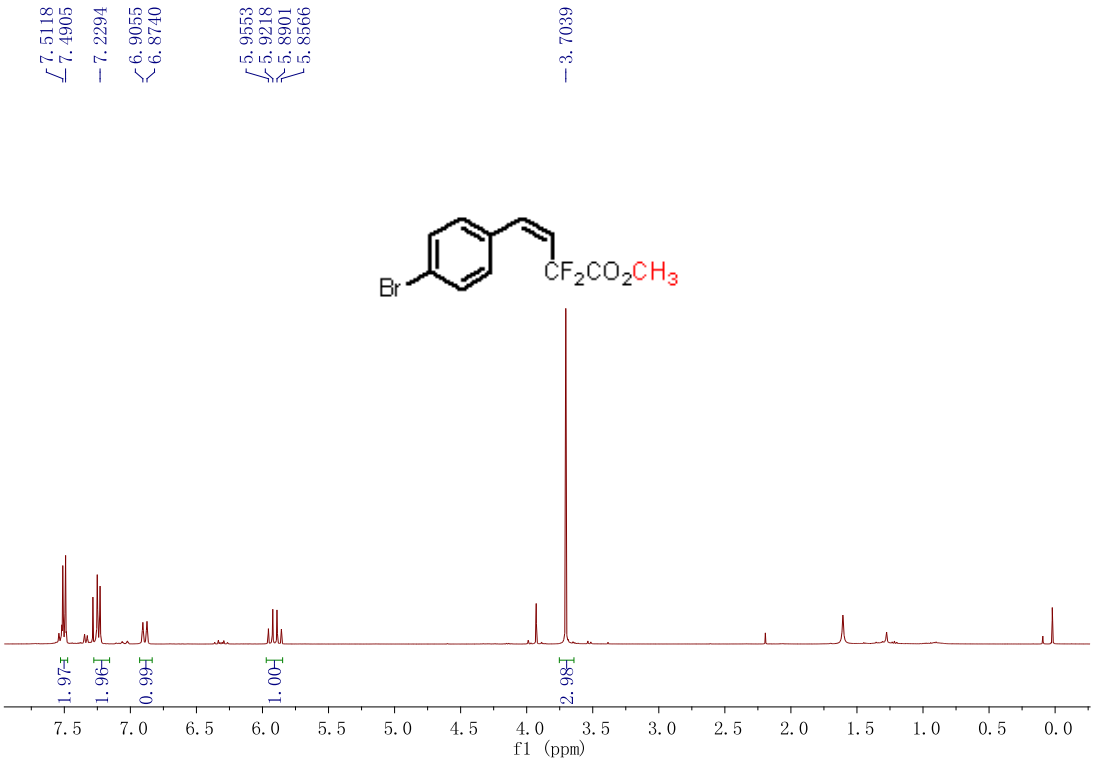
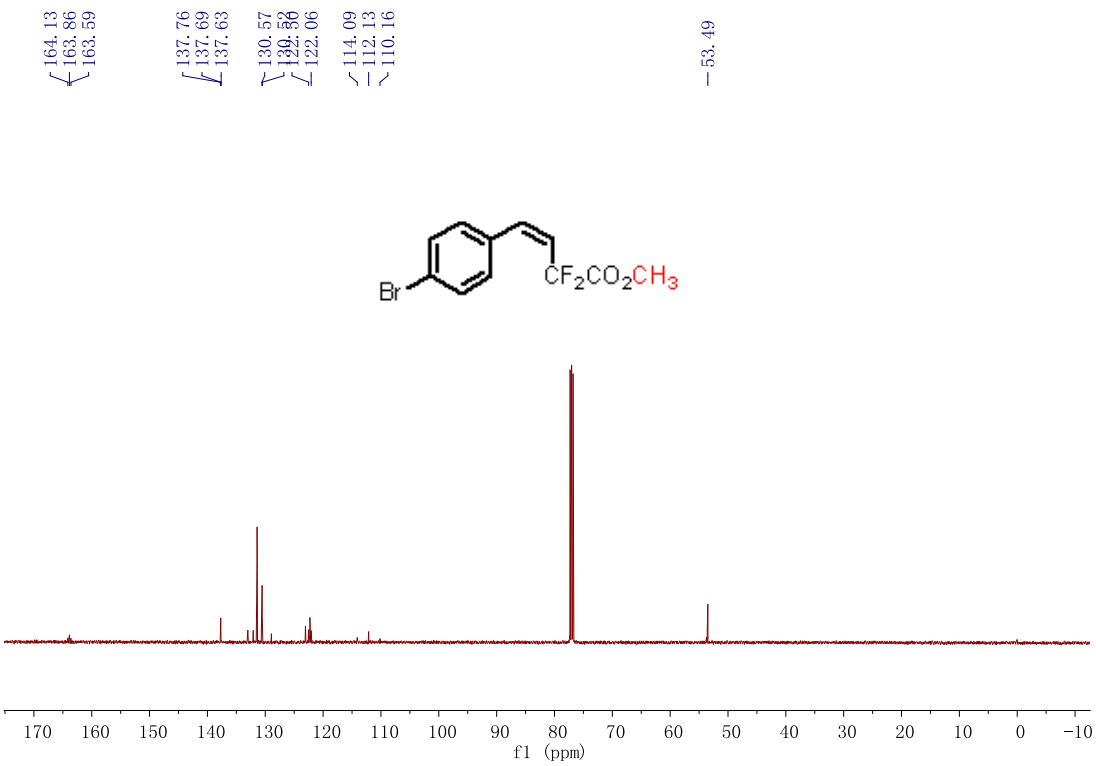
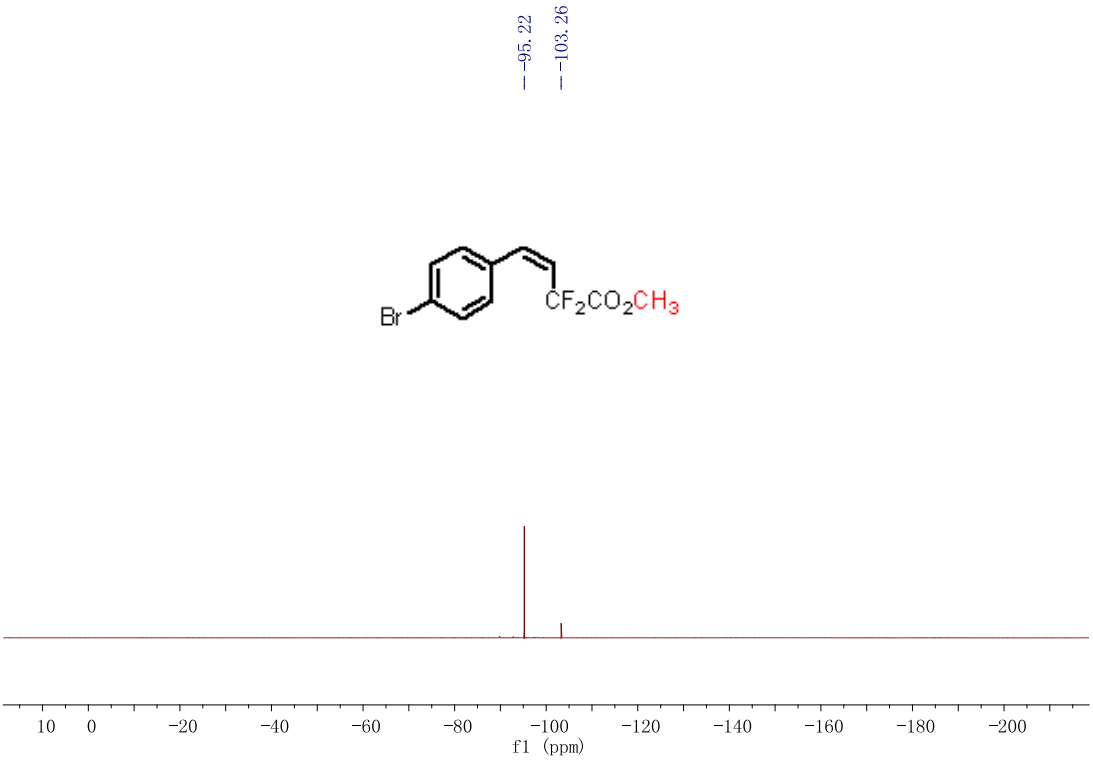
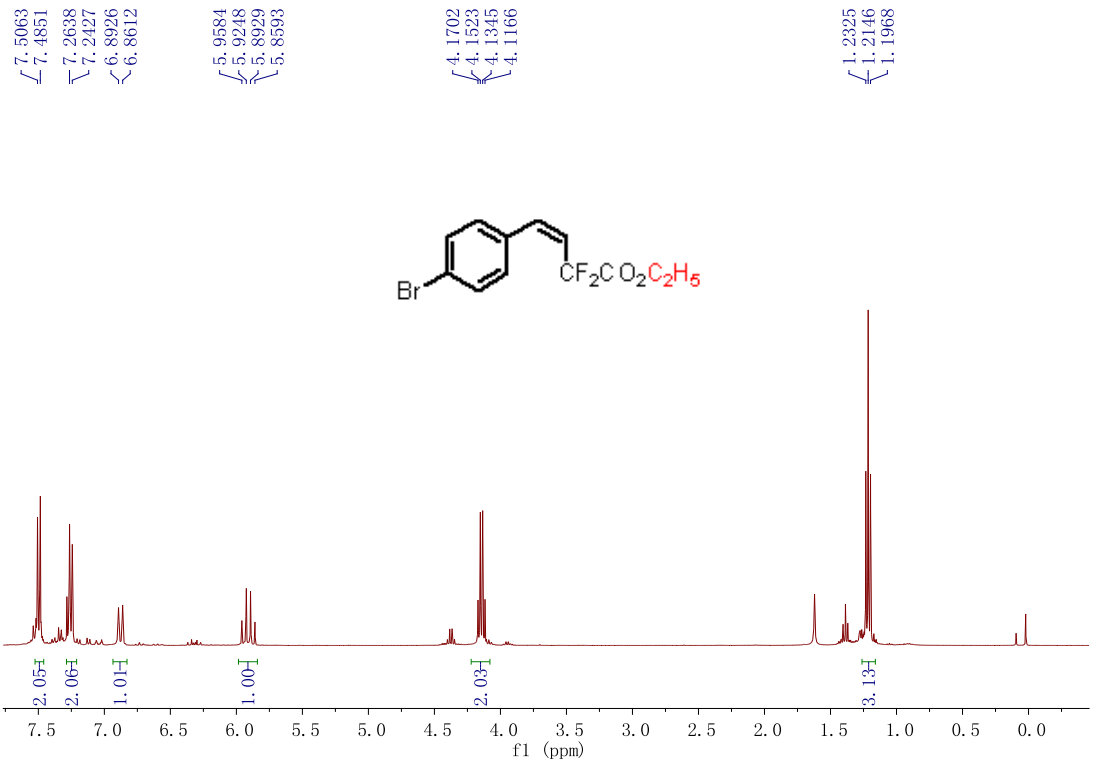
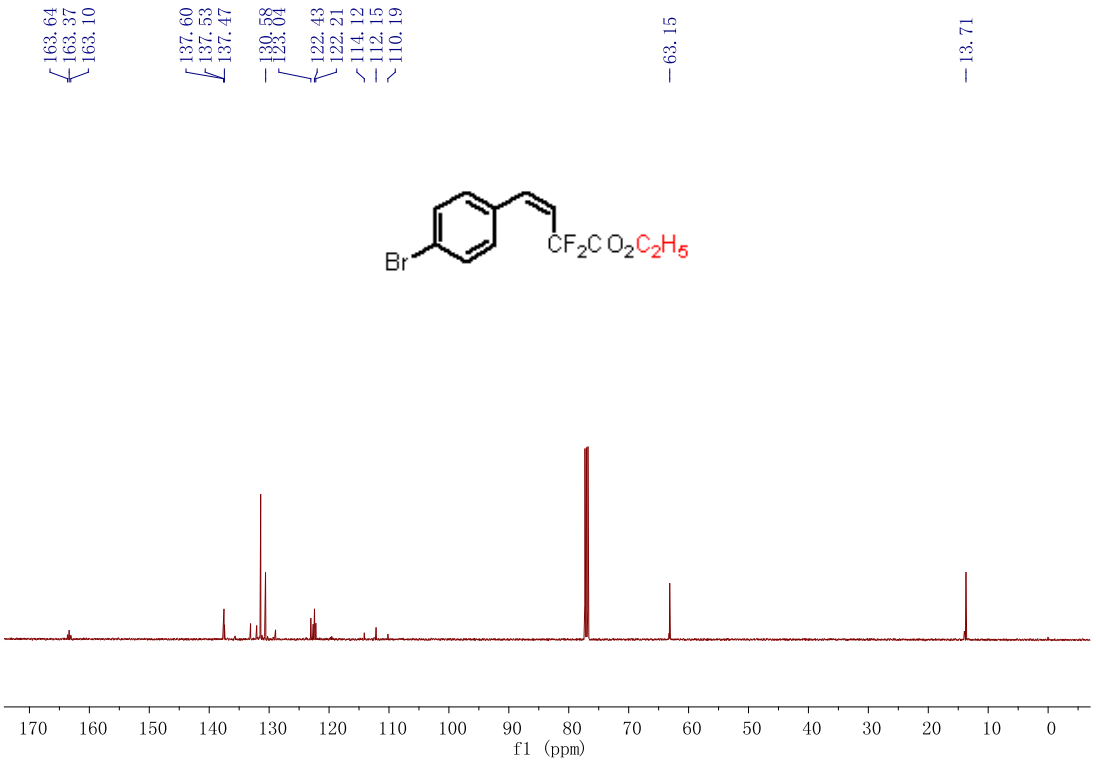
-103.36
Cl
CF2CO2C2H5
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)

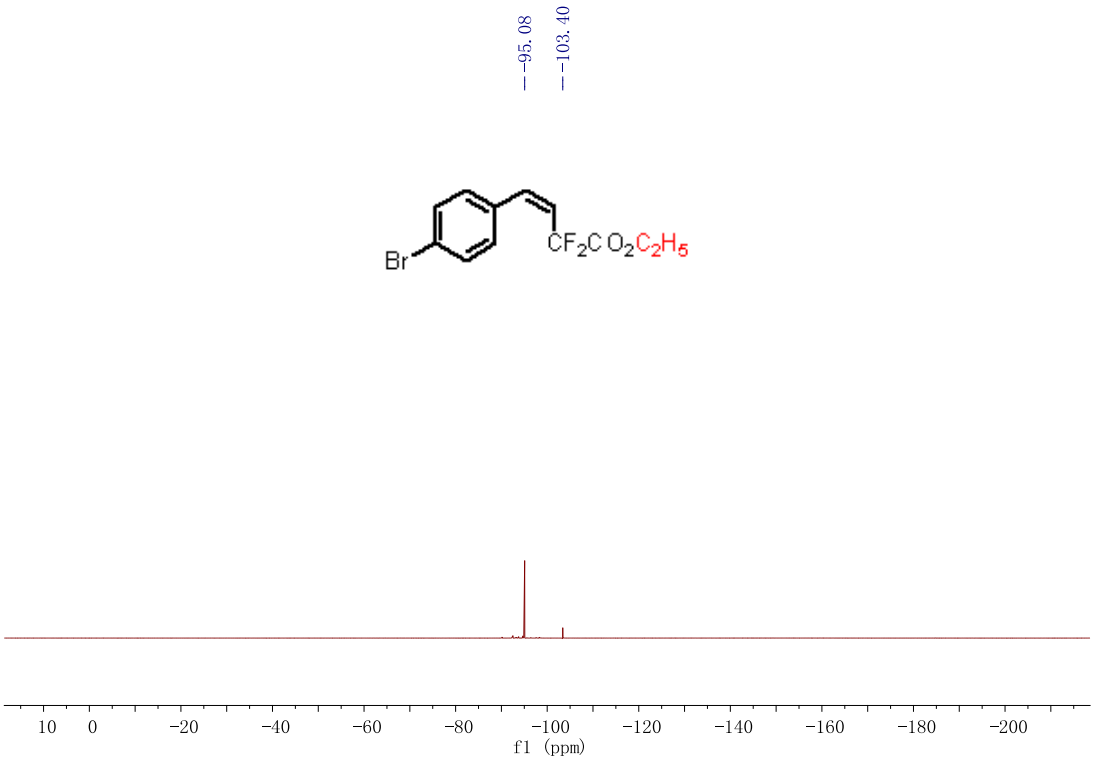

7.5118
7.4905
7.2294
6.9055
6.8740
5.9553
5.9218
5.8901
5.8566
3.7039
Br
CF2CO2CH3
1.97
1.96
0.99
1.00
2.98
f1 (ppm)

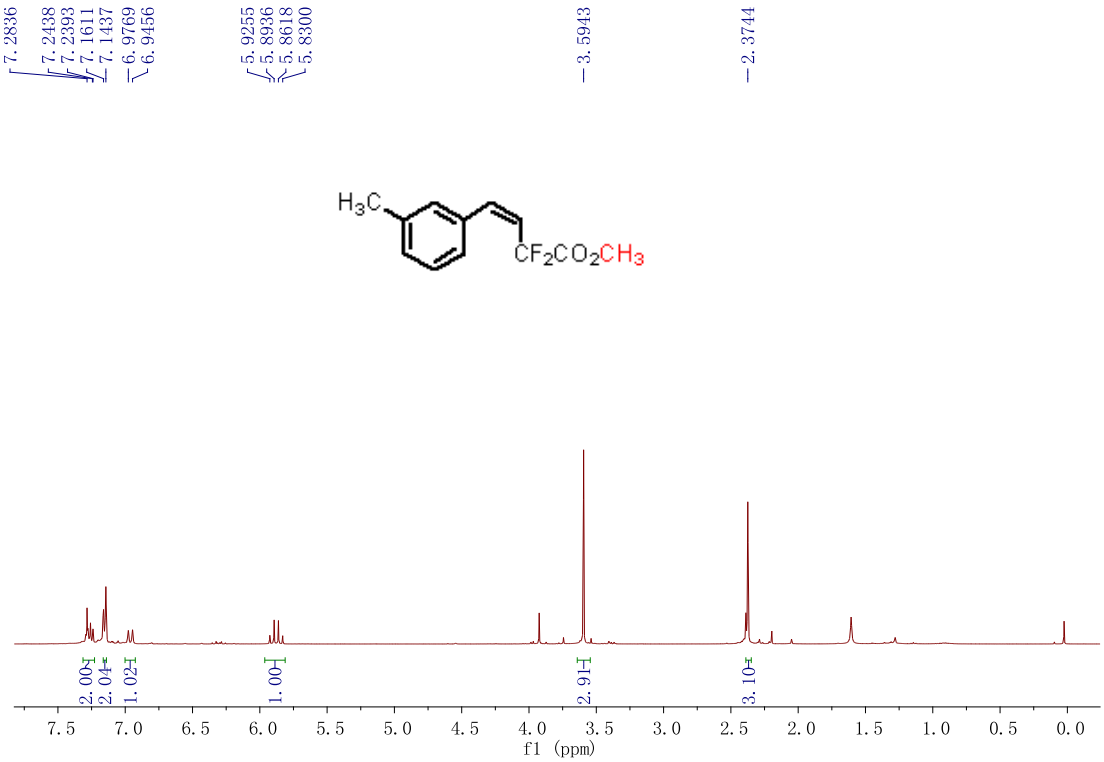

164.13
163.86
163.59
137.76
137.69
137.63
130.57
122.06
114.09
112.13
110.16
53.49
Br
CF2CO2CH3
f1 (ppm)


-95.22
-103.26
Br
CF2CO2CH3
10
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)


7.5063
7.4851
7.2638
7.2427
6.8926
6.8612
5.9584
5.9248
5.8929
5.8593
4.1702
4.1523
4.1345
4.1166
1.2325
1.2146
1.1968
Br
CF2CO2C2H5
2.05
2.06
1.01
1.00
2.03
3.13
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


163.64
163.37
163.10
137.60
137.53
137.47
130.58
123.04
122.43
122.21
114.12
112.15
110.19
63.15
13.71
Br
CF2C O2C2H5
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-95.08
-103.40
Br
CF2C O2C2H5
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)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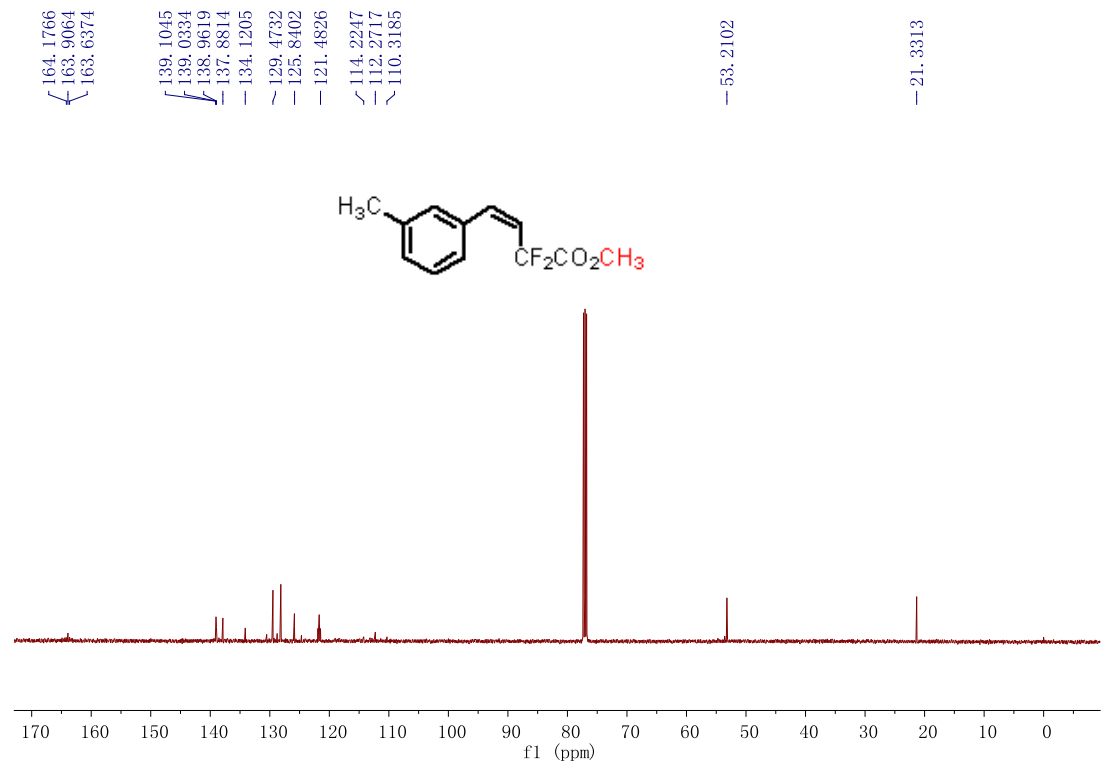
7.2438
7.2393
7.1611
7.1437
6.9769
6.9456
5.9255
5.8936
5.8618
5.8300
3.5943
2.3744
H3C
CF2CO2CH3
2.00
2.04
1.02
1.00
2.91
3.10
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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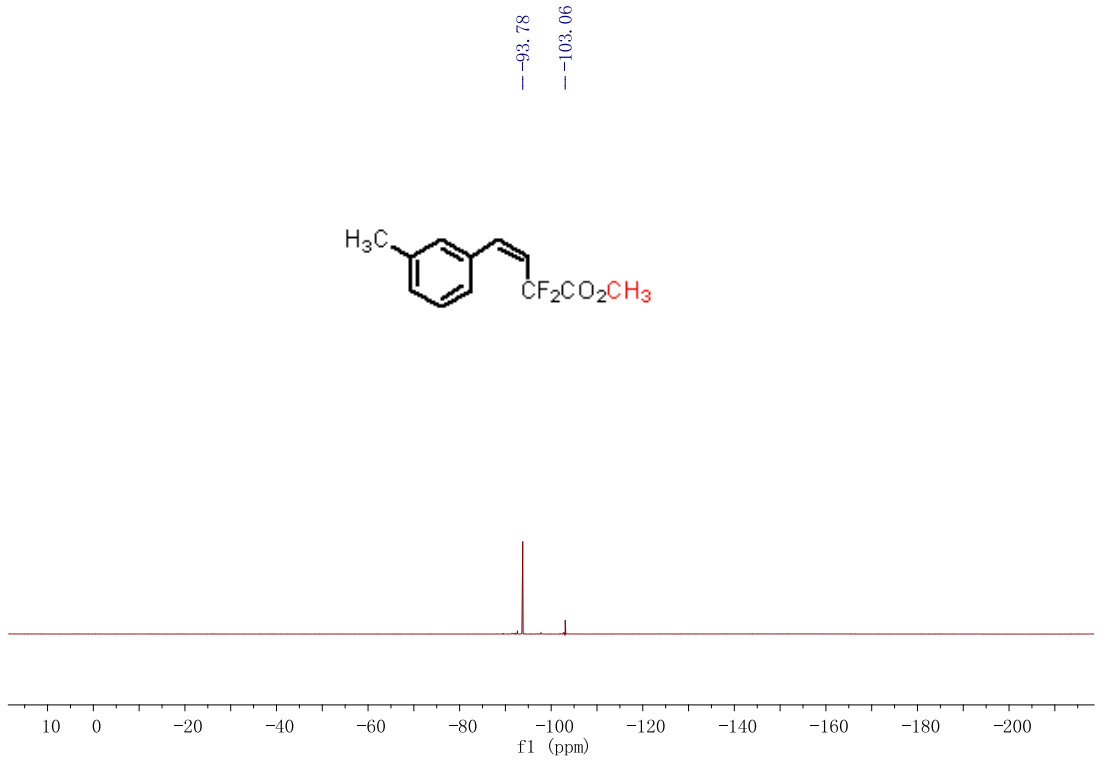
163.6374
139.1045
139.0334
138.9619
137.8814
134.1205
129.4732
125.8402
121.4826
114.2247
112.2717
110.3185
53.2102
21.3313
H3C
CF2CO2CH3
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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-103.06
H3C
CF2CO2CH3
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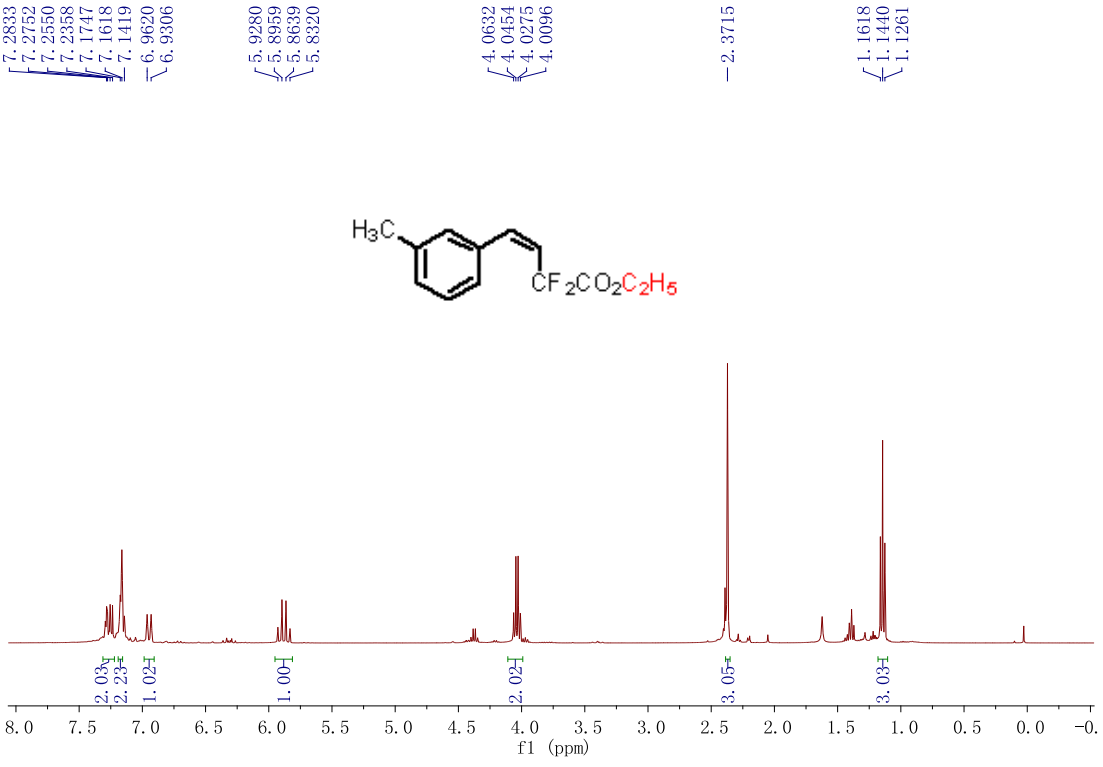
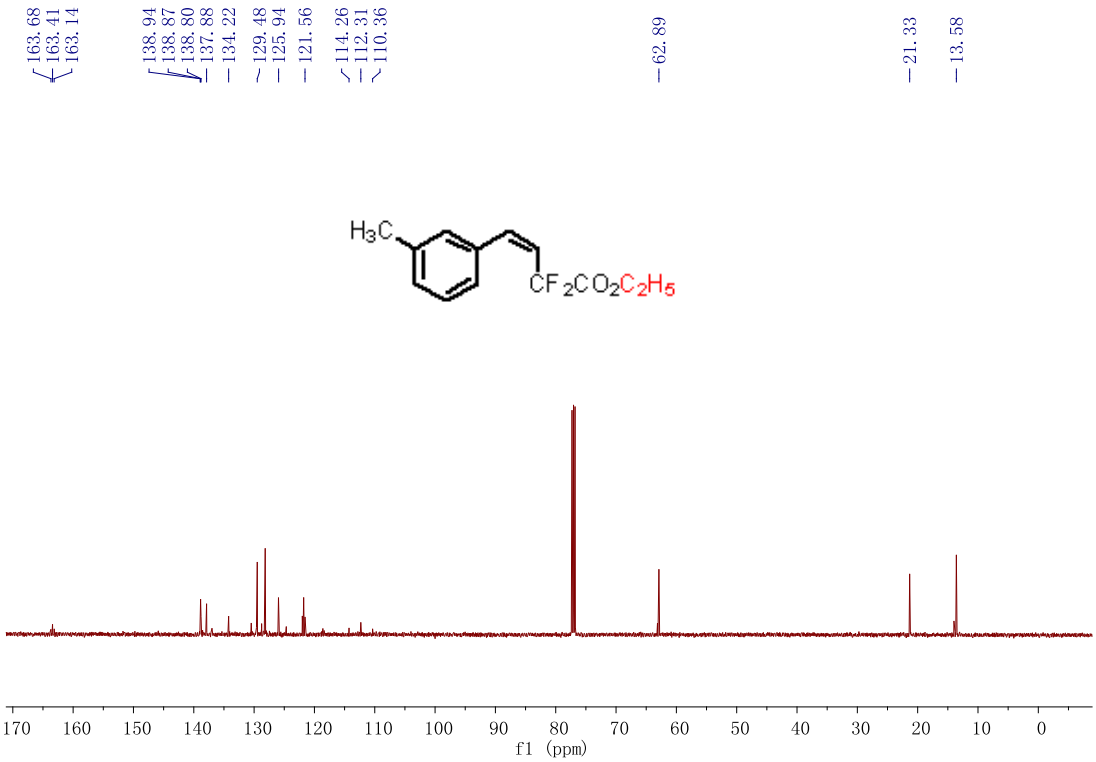
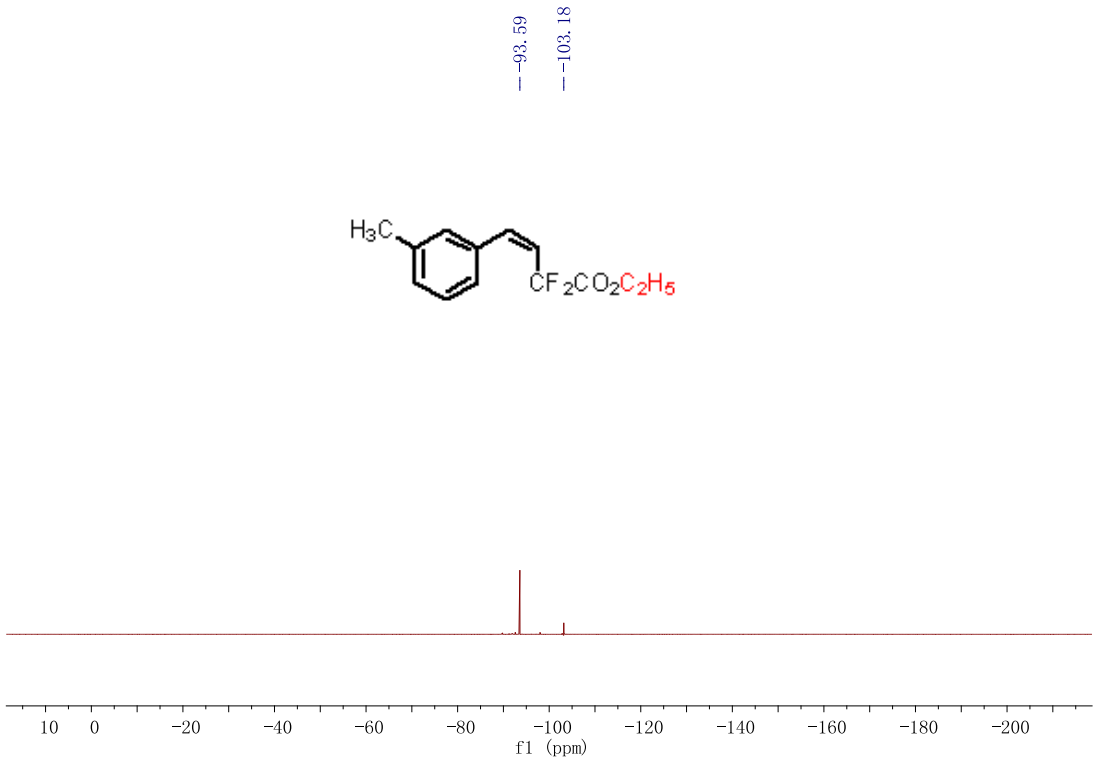
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
f1 (ppm)


7.2833
7.2752
7.2550
7.2358
7.1747
7.1618
7.1419
6.9620
6.9306
5.9280
5.8959
5.8639
5.8320
4.0632
4.0454
4.0275
4.0096
2.3715
1.1618
1.1440
1.1261
H3C
CF2CO2C2H5
2.03
2.23
1.02
1.00
2.02
3.05
3.03
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


163.68
163.41
163.14
138.94
138.87
138.80
137.88
134.22
129.48
125.94
121.56
114.26
112.31
110.36
62.89
21.33
13.58
H3C
CF2CO2C2H5
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


-93.59
-103.18
H3C
CF2CO2C2H5
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)